UNCLASSIFIED

QUALITATIVE ASSESSMENT REPORT
PORTABLE FLIGHT PLANNING SOFTWARE (PFPS)

September 1997
by

Capt R. S. Barr USMC
Project Action Officer
Assault Support Department

Maj M. T. Sampson USMC
Coordinating Officer
ADT&E Department

for

Maj J. S. Bennett USMC
PMA-233, NAVAIRSYSCOM

Completion Date: 25 February 1998

MARINE AVIATION WEAPONS AND TACTICS SQUADRON ONE
MCAS YUMA, AZ

UNCLASSIFIED

REPORT DOCUMENTATION PAGE

Form Approved OMB No. 0704

1. AGENCY USE ONLY *(Leave blank)*	2. REPORT DATE February 1998	3. REPORT TYPE AND DATES COVERED Qualitative Assessment, Sep 97-Feb 98

4. TITLE: **Qualitative Assessment of Portable Flight Planning Software (PFPS)**

5. FUNDING NUMBERS: NA

6. AUTHOR(S) Barr, Robert S.; Sampson, Matthew T.

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
Marine Aviation Weapons and Tactics Squadron One. Box 99200
Yuma, AZ 85369-9200

8. PERFORMING ORGANIZATION REPORT NUMBER
NA

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)
Major Steve Bennett, PMA 233, NAVAIRSYSCOM, NAS Patuxent River, MD 20702

10. SPONSORING/MONITORING AGENCY REPORT NUMBER

11. SUPPLEMENTARY NOTES: The views expressed in this report are those of MAWTS-1 and do not reflect the official policy or position of the Department of Defense or the U.S. Government.

12a. DISTRIBUTION/AVAILABILITY STATEMENT: Approved for public release; distribution unlimited.

12b. DISTRIBUTION CODE:
A

13. ABSTRACT: With the exponential increase in computer capabilities in the last ten years, the Department of Defense and the Department of the Navy (DoN) has sought to equip Navy and Marine forces with more capable and compact Automated Mission Planning Systems (AMPS). Despit these efforts, there currently is no single AMPS which satisfies the AMPS requirements for all DoN aircraft. There are, however, numerous AMPS's being employed to fill the shortfall. One interim fix being explored by DoN is Portable Flight Planning Software (PFPS). PFPS is a PC-based AMPS, developed by the Air Force and Georgia Tech Research Institute, which presents the Combat Flight Planning Software (CFPS) interactive time, distance, heading, and fuel card and the Falcon View mapping toolkit simultaneously. Other capabilities include the ability to interface with digital maps, imagery, terrain elevation data and aeronautical flight information files. Upon request from PMA-233, a Qualitative Asessment (QA) of PFPS was conducted by Marine Aviation Weapons and Tactics Squadron One (MAWTS-1) during Weapons and Tactics Instructor (WTI) Course 1-98. Approximately forty experienced aviators from the Marine Corps and Air Force participated in the assessment. The asessment consisted of classrom training, computer lab, and self paced study. Respondent opinions were capured in a single survey administered three times during the course. Respondents were surveyed on their background information, their computer and AMPS experience, the adequacy of PFPS training received, the difficulty of using PFPS Human Machine Interfaces (HMI), the adequacy of PFPS documentation, the compatability of PFPS with various mission planning requirements, the reliability of PFPS, the maintainability of PFPS, and the tactical impact and time savings realized while using PFPS. Also, proposed functionality enhancement valididy and functionality enhancement ranking was asessed. PFPS was very well received by the respondents as an extremely valuable planning tool and it was quickly assimilated into their mission planning tasks. After reviewing the data from the surveys and coupling it with observations, human factors, compatability, reliability, maintainability, and tactical impact/time savings of PFPS were all noted for possessing enhancing characteristics. Slight deficiences in training, human factors, documentation, maintainability, and other areas were noted. Based on the asessment results and observations, the Project Action Officer recommends the following actions to CNO N62, CNO N880 and PMA-233 as appropriate: (1) provide rapid dissemination of the most current version of PFPS to all DoN squadrons; (2) plan and provide for rapid implementation of PFPS Mission Data Loader Receptacle (MDLR) hardware and software upgrades for all existing and future DoN mission planning computers; (3) fund PFPS Serpentine (Circumlinear) route drawing tool capability, Map Scan capability and the Hover Tool; (4) augment existing fleet AMPS computer hardware with limited laptop and desktop computer buys; (5) fund the capability to create a single mission folder to hold multiple route, threat and drawing overlays; (6) fund rapid correction of all deficiencies with PFPS noted in this assessment report, and (7) fund the remaining Flight Performance Modules for all aircraft in the Naval Aviation Inventory and any aircraft currently under development (i.e., V-22). The Project Action Officer also recommends that follow-on AMPS's (TAMPS 7.0/JMPS) be modeled after PFPS and that future AMPS architecture be aligned with the computer capabilities of the users, as presented in this assessment.

14. SUBJECT TERMS PFPS, Mission Planning Systems, TAMPS, Automated Mission Planning, MDLR			15. NUMBER OF PAGES 62 16. PRICE CODE
17. SECURITY CLASSIFICATION OF REPORT Unclassified	18. SECURITY CLASSIFICATION OF THIS PAGE Unclassified	19. SECURITY CLASSIFICATION OF ABSTRACT Unclassified	20. LIMITATION OF ABSTRACT Unlimited

QUALITATIVE ASSESSMENT REPORT

PORTABLE FLIGHT PLANNING SOFTWARE (PFPS)

MARINE AVIATION WEAPONS AND TACTICS SQUADRON ONE

FEBRUARY 1998

SUBMITTED BY: Robert S. Barr

Robert S. Barr

Matthew T. Sampson

Matthew T. Sampson

APPROVED BY:

Keith J. Stalder
Commanding Officer

EXECUTIVE SUMMARY

With the exponential increase in computer capabilities in the last ten years, the Department of Defense and the Department of the Navy (DoN) has sought to equip Navy and Marine forces with more capable and compact Automated Mission Planning Systems (AMPS). Despit these efforts, there currently is no single AMPS which satisfies the AMPS requirements for all DoN aircraft. There are, however, numerous AMPS's being employed to fill the shortfall. One interim fix being explored by DoN is Portable Flight Planning Software (PFPS). PFPS is a PC-based AMPS, developed by the Air Force and Georgia Tech Research Institute, which presents the Combat Flight Planning Software (CFPS) interactive time, distance, heading, and fuel card and the Falcon View mapping toolkit simultaneously. Other capabilities include the ability to interface with digital maps, imagery, terrain elevation data and aeronautical flight information files.

Upon request from PMA-233, a Qualitative Asessment (QA) of PFPS was conducted by Marine Aviation Weapons and Tactics Squadron One (MAWTS-1) during Weapons and Tactics Instructor (WTI) Course 1-98. Approximately forty experienced aviators from the Marine Corps and Air Force participated in the assessment. The asessment consisted of classrom training, computer lab, and self paced study. Respondent opinions were capured in a single survey administered three times during the course. Respondents were surveyed on their background information, their computer and AMPS experience, the *adequacy* of PFPS training received, the *difficulty* of using PFPS Human Machine Interfaces (HMI), the *adequacy* of PFPS documentation, the *compatability* of PFPS with various mission planning requirements, the *reliability* of PFPS, the *maintainability* of PFPS, and the *tactical impact* and *time savings* realized while using PFPS. Also, proposed functionality enhancement valididy and functionality enhancement ranking was asessed.

PFPS was very well received by the respondents as an extremely valuable planning tool and it was quickly assimilated into their mission planning tasks. After reviewing the data from the surveys and coupling it with observations, human factors, compatability, reliability, maintainability, and tactical impact/time savings of PFPS were all noted for possessing enhancing characteristics. Slight deficiences in training, human factors, documentation, maintainability, and other areas were noted.

Based on the asessment results and observations, the Project Action Officer recommends the following actions to CNO N62, CNO N880 and PMA-233 as appropriate: (1) provide rapid dissemination of the most current version of PFPS to all DoN squadrons; (2) plan and provide for rapid implementation of PFPS Mission Data Loader Receptacle (MDLR) hardware and software upgrades for all existing and future DoN mission planning computers; (3) fund PFPS Serpentine (Circumlinear) route drawing tool capability, Map Scan capability and the Hover Tool; (4) augment existing fleet AMPS computer hardware with limited laptop and desktop computer buys; (5) fund the capability to create a single mission folder to hold multiple route, threat and drawing overlays; (6) fund rapid correction of all deficiencies with PFPS noted in this assessment report, and (7) fund the remaining Flight Performance Modules for all aircraft in the Naval Aviation Inventory and any aircraft currently under development (i.e., V-22). The Project Action Officer also recommends that follow-on AMPS's (TAMPS 7.0/JMPS) be modeled after PFPS and that future AMPS architecture be aligned with the computer capabilities of the users, as presented in this assessment.

ACRONYMS AND ABBREVIATIONS

AMPS	Automated Mission Planning System
AOA	Analysis Of Alternatives (formerly COEA)
ASD	Assault Support Department (MAWTS-1)
CADRG	Compressed Arc Digitized Raster Graphics
CFPS	Combat Flight Planning Software
COEA	Cost and Operational Effectiveness Analysis
COTS	Commercial Off-The-Shelf
CTI	Critical Tactical Issue
DAFIF	Digital Aeronautical Flight Information Files
DIICOE	Defense Information Infrastructure Common Operating Environment
DoN	Department of the Navy
DOS	Disk Operating System
DTED	Digital Terrain Elevation Data
DTM	Data Transfer Module
FPM	Flight Performance Module
GCCS	Global Command And Control System
GUI	Graphical User Interface
JMPS	Joint Mission Planning Segments
Mb	Megabyte
MDL	Mission Data Loader
MDLR	Mission Data Loader Receptacle
MERA	Mission Effectiveness Radius of Action
MOE	Measure Of Effectiveness
MOS	Measure Of Suitability
NIMA	National Imagery and Mapping Agency
OJT	On-the-Job Training
ORD	Operational Requirements Document
ORM	Operational Risk Management
PC	Personal Computer
PFPS	Portable Flight Planning Software
RTM	Radar Terrain Masking
TACAIR	Tactical Air department (MAWTS-1)
TAMPS	Tactical Automated Mission Planning System
TEMP	Test and Evaluation Master Plan
TOLD	TakeOff and Landing Data

TABLE OF CONTENTS

APPENDICES

COLOPHON

1.0 BACKGROUND With the exponential increase in computer capabilities in the last ten years, the Department of Defense and the Department of the Navy (DoN) has sought to equip Navy and Marine forces with more capable and compact Automated Mission Planning Systems (AMPS). One of the first AMPSs, procured in 1986 by the Navy, was the Tactical Automated Mission Planning System (TAMPS). TAMPS was originally purchased by the Navy without going through normal acquisition channels. However, since the establishment of the program office in 1990, an Operational Requirements Document (ORD) and a Test and Evaluation Master Plan (TEMP) for DoN AMPSs have been developed. The ORD for DoN AMPSs is currently under revision by the program sponsor, N-62.

TAMPS, through its many software versions and hardware configurations, has filled the mission planning needs of the FA-18 community for the past 11 years. Although many attempts have been made to make TAMPS useable tool for Assault Support Aircraft (all helicopters and KC-130s), this system does not currently have a true mission planning capability for those platforms.

In an effort to produce a TAMPS version that supports all Navy/Marine air/ground assets as well as one which complies with Joint AMPS interoperability guidelines, PMA-233 has ordered the last TAMPS functionality release (TAMPS 6.2, due in 1998) while focusing on a complete reengineering of TAMPS to be released by 2003 (TAMPS 7.0).

In order to provide a partial solution for the AMPS needs of all air and ground communities, PMA-233 has procured the Portable Flight Planning Software (PFPS) from the 46th Test Squadron at Eglin AFB, FL. In June of 1997, MAWTS-1 was asked by PMA-233 to conduct a Qualitative Assessment (QA) of this software during WTI 1-98. The C.O. of MAWTS-1 approved the assessment plan in September 1997. A QA on PFPS was conducted at MAWTS-1 during the Weapons and Tactics Instructor (WTI) 1-98 class.

2.0 PURPOSE The purpose of this Qualitative Assessment was to assess the capabilities of PFPS as an AMPS and to survey fleet representatives attending WTI 1-98 on additional capabilities they would like to see in TAMPS 7.0 or any future AMPSs as they are fielded.

3.0 DESCRIPTION OF SOFTWARE.

3.1 Basic Aircraft Not applicable.

3.2 Assessment Aircraft Modification/Instrumentation Not applicable.

3.3 Assessment Item. PFPS Version 3.0, Phase 2A (beta), is a joint, Air Force and Georgia Tech Research Instituted, developed, government-owned, PC-based, AMPS that integrates FalconView digital mapping software, Combat Flight Planning Software (CFPS) and other software to provide the user with:

- Windows 95 / NT-4.0 Graphical User Interface (GUI)
- Point and click route editing
- Selectable map scales

- Unclassified (Jane's type) threat plotting (RTM, MERA)

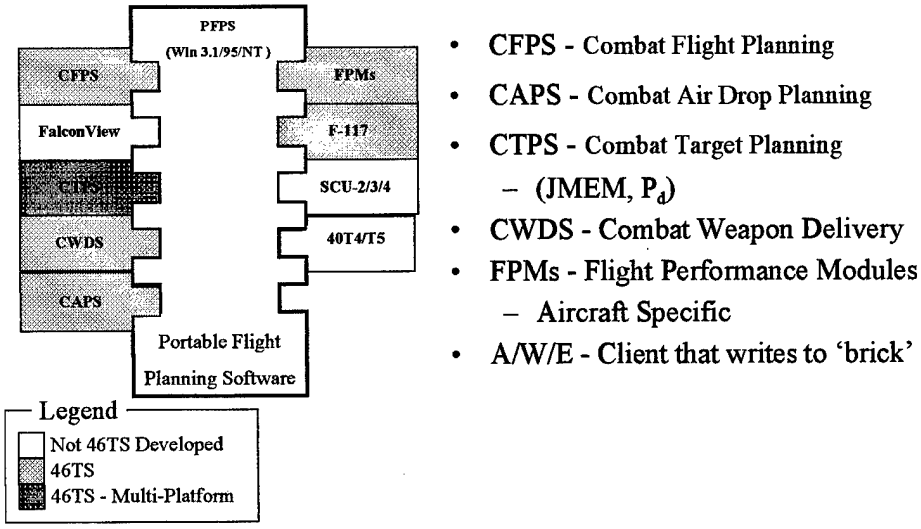
- Customized kneeboard card, map products and artwork

- Interoperability with other AMPSs

- NIMA standard world maps, DAFIF, CMS DTED* and other interfaces

Figure 3.1 is a diagram depicting PFPS product modules that 'plug-in' to the 'core' software, each module is shaded according to its developer. These modules can be added, replaced or removed as required. Figure 3.2 is a wire diagram depicting the relationships between the central hub (Route Server) and all of the product modules. Also depicted are the interrelationships between the various product modules. Figure 3.3 is a basic depiction of 'how PFPS works', focusing on some of the modules users may access more frequently.

PFPS Products



- CFPS - Combat Flight Planning
- CAPS - Combat Air Drop Planning
- CTPS - Combat Target Planning
  - (JMEM, P_d)
- CWDS - Combat Weapon Delivery
- FPMs - Flight Performance Modules
  - Aircraft Specific
- A/W/E - Client that writes to 'brick'

Figure 3.1. PFPS Products. A conceptualization of how product modules, shaded according to their developer, 'plug-in' to the core software.

* NIMA DTED incorporation is expected as an interim release between PFPS 3.0 and 3.1

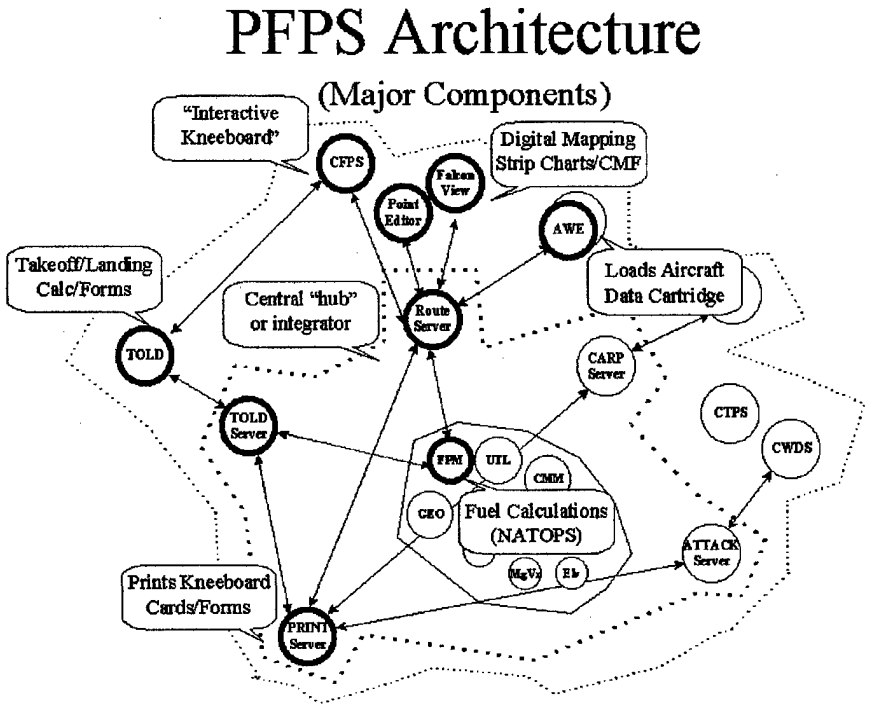


Figure 3.2. PFPS Architechture. Depicted is the relationship between the central hub (Route Server) and all other product modules. Also depicted are the product module interrelationships. Annotations provide basic descriptions of the module's function.

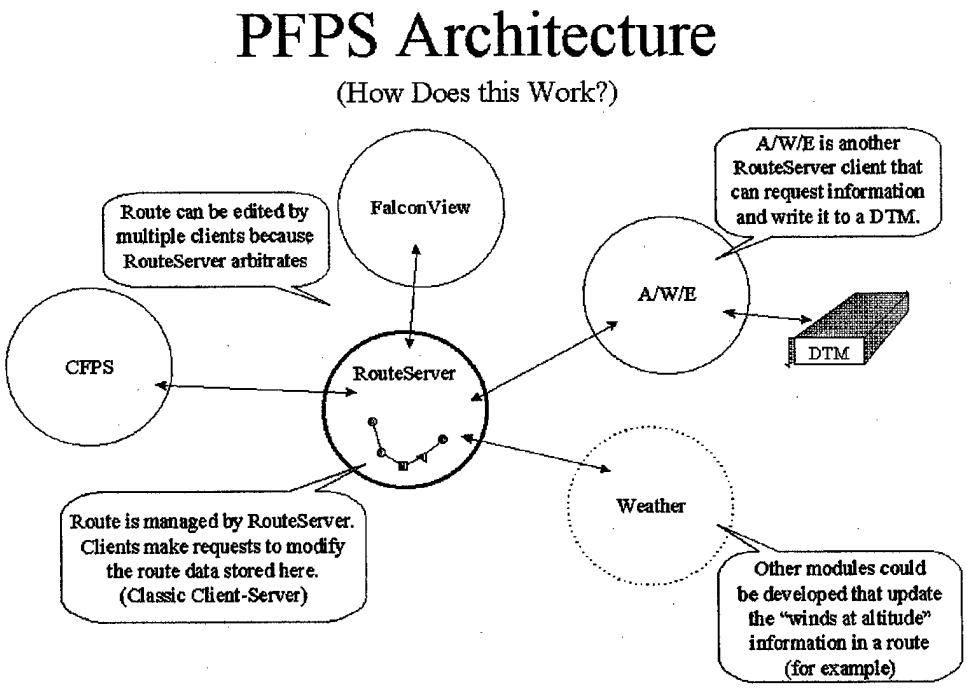


Figure 3.3 PFPS Architecture. Depicted is a diagram of basically 'how PFPS works' illustrating interactions between some of the major product modules.

Appendix A is a brochure on PFPS prepared by the 46th Test Squadron. The brochure is written to highlight the capabilities PFPS provides to its original customer, the Air Force, however, it does not contain information on the upgrades in the PFPS version that will be used in this assessment.

4.0 SCOPE OF ASSESSMENT

4.1 Assessment and Assessment Conditions. This assessment involved training students on PFPS, surveying them on their knowledge and opinions of current AMPSs and the suitability of PFPS, allowing them to become more familiar with the software and then surveying them two more times about PFPS and what they would like to see in future AMPSs.

4.2 Assessment Envelope. This assessment was conducted solely during WTI 1-98. Training and surveying was conducted during scheduled times (Table 2). Self-paced training by students was conducted on a not-to-interfere basis with other WTI evolutions.

4.3 Flight Clearance. Since PFPS mission data loader capabilities was not available, a flight clearance for this assessment was not applicable.

4.4 Assessment Loadings. PFPS Version 3.0, Phase 2A (beta) was the only software loaded on computers involved in this assessment. Students and instructors were encouraged to install only this version on any personal or community computers they may practice on.

4.5 Assessment Configurations/Profiles. PFPS Version 3.0, Phase 2C (beta) was installed on a three-computer suite, located in the mission planning room (S-2 Ready Room) and consisting of one desktop 200 MHz Pentium PC and two notebook 200 MHz Pentium PCs. This suite was linked by way of a junction box to a single Hewlett Packard 870CXI Deskjet color printer. Since the software includes only the FA-18 Flight Performance Module in its aircraft selection menu, baseline flight plan files were created and saved in CFPS for the other type/model/series aircraft. This 'work-around' enabled users to open an aircraft-specific flight plan with its 'homeplate' (first waypoint) located at MCAS Yuma and with all the aircraft weight and performance information preprogrammed. Additionally, a WTI control point database was loaded on each computer, enabling the user to select the control points as a Local Point overlay on their FalconView display.

Because of the core PFPS program's relatively small computer storage requirement, approximately 233 Megabytes (Mb), students and instructors were able to load copies of PFPS Version 3.0 on their Windows 95/NT equipped notebooks or desktop PCs for additional practice at their leisure.

4.6 Assessment Criteria. The Critical Tactical Issues (CTIs) that were addressed during this assessment are: a) Training, b) Human Factors, c) Documentation, d) Compatibility, e) Reliability, f) Maintainability and g) Tactical Impact of PFPS. These CTIs were assessed by way of written surveys that the respondents filled out. Some of the questions are quantitative in nature and therefore require the respondent to provide a number or text input. Other questions are qualitative in nature, providing a Likert rating scale for the respondent to express their level of agreement with a statement about the suitability or effectiveness of PFPS. Appendixes D is the Initial Survey, designed to capture background information. Appendix E is the Follow-on Survey format that was used to capture the opinions of the respondents on the CTIs.

Below is an expansion of each CTI, highlighting the integral measures of suitability or effectiveness:

4.6.a CTI: PFPS Training

Suitability Test (S-test): Training

Object: Was the training on PFPS during WTI 1-98 adequate enough for students to mission plan with PFPS?

Procedure: Training issues were assessed via the *Training* section of the survey.

Measure of Suitability (MOS): The *Training* section of the survey addresses the respondent's opinion on the adequacy of: a) Formal classroom training, b) Formal hands-on training, c) On-the-job (OJT) training time availability, d) hours trained on PFPS and e) whether the respondent feels confident enough to teach PFPS to their squadron.

4.6.b CTI: PFPS Human Factors

S-test: Human Factors

Object: What impact did PFPS have on key human-machine interface issues?

Procedure: Human Factors issues were assessed via the *Human Factors* section of the survey.

Measure of Suitability (MOS): The *Human Factors* section of the survey addresses respondent's opinion on the level of difficulty working with a) Available hardware, b) PFPS Graphical User Interface, c) PFPS startup sequence, and d) Major Falcon View and CFPS menu items.

4.6.c CTI: PFPS Documentation

S-test: Documentation

Object: Was the documentation on PFPS adequate enough for students to mission plan with PFPS?

Procedure: Documentation issues were assessed via the *Documentation* section of the survey.

Measure of Suitability (MOS): The *Documentation* section of the survey addresses respondent's opinion on: a) Hard copy user's guides, b) On-line help and c) Amplifying instructions in pull-down/pop-up menus.

4.6.d CTI: PFPS Compatibility

S-test: Compatibility

Object: Were the modules and products of PFPS compatible with the available hardware and with mission planning needs?

Procedure: Compatibility was assessed via the *Compatibility* section of the survey.

Measure of Suitability (MOS): The *Compatibility* section of the survey addresses the respondent's opinion on the level of compatibility between: a) PFPS and the Windows 95 operating system, b) CFPS and FalconView, c) PFPS print options and the available printer, d) PFPS printed products with mission briefing/smartpack requirements, and e) Major PFPS menu selections with mission planning requirements.

4.6.e CTI: PFPS Reliability

S-test: Reliability

Object: Was PFPS and its major modules reliable?

Procedure: Reliability was assessed via the *Reliability* section of the survey.

Measure of Suitability (MOS): The *Reliability* section of the survey addresses the respondent's opinion on the level of reliability of: a) The CFPS module, b) The FalconView module, c) The Route Server, and d) PFPS running on Windows 95.

4.6.f CTI: PFPS Maintainability

S-test: Maintainability

Object: Was PFPS maintainable and did respondents feel knowledgeable enough to maintain it in their squadron?

Procedure: Maintainability will be assessed via the *Maintainability* section of the survey.

Measure of Suitability (MOS): The *Maintainability* section of the survey addresses the respondent's opinion of their capability to: a) Install PFPS, b) Troubleshoot problems with PFPS, c) Access technical support.

4.6.g CTI: PFPS Tactical Impact

Effectiveness-test (E-test): Tactical Impact

Object: What would be the impact of using PFPS to plan for a tactical mission?

Procedure: Tactical impact was assessed via a single question in the *General* section of the survey.

Measure of Effectiveness (MOE): The questions in the *General* section of the survey addresses the respondent's opinion of the level of significance PFPS contributed to tactical impact in planning tactical missions.

For application of advanced statisics under the assumptions of the Central Limit Theorem, this assessment required that at least 30 students (not previously familiar with PFPS) complete the initial PFPS training, continue with OJT and complete all 3 survey sessions.

5.0 METHOD OF ASSESSMENT

5.1 Assessment Method and Procedures. The assessment commenced with PFPS classroom instruction during the Common Academics Phase. Upon receipt of this training, the participants were surveyed on basic demographics and questions about their AMPS and computer experience. After this initial instruction, students used after-class hours time for hands-on with one of the three computers to practice working with PFPS. Students who brought their own computers had PFPS Version 3.0 installed in order to practice mission planning in a self-paced environment. Evolution Coordinators ensured as much as possible that the 'PFPS Guy' billet rotated as the flying evolutions progressed. The Baseline, intermediate and Final Surveys were administered after the Specific Flying phase, after Assault Support Tactics and at the end of the course respectively in order to capture trends in student opinions.**

5.1.a Pre-assessment Checks. Prior to the start of WTI 1-98, the 3-computer suite was set up in the mission planning room and PFPS was installed on each computer. Once PFPS was installed, all 3 computers had the WTI 1-98 control point data base installed as well as the baseline aircraft-specific routes loaded on them.

After the load, all facets of PFPS applicable to the assessment were run, checked for accuracy (see subsection 6.1 Operational Risk Management) and debugged. To facilitate implementing software improvements, a discrepancy sheet was posted by each machine for users to document problems with the software. Discrepancies found were corrected by MAWTS-1 staff. More serious problems were going to be forwarded expeditiously to the software developer as that information is outside the scope of this assessment and need not be held until publishing the report but this was not required.

The survey designed for this assessment was reviewed for validity and comprehensibility of the questions prior to it being administered to the students.

5.1.b Pre-assessment Training. Initial training for MAWTS-1 instructors was conducted during July, 1997. This training consisted of classroom instruction, a demonstration and some 'hands-on' instruction. The instructor training was performed by Captain Barr and Mr. Jon Drof of Litton PRC. Litton PRC is the Navy's contractor for conducting fleet training for the Navy/Marine PFPS program.

During WTI 1-98, training for students and instructors on PFPS consist of a 30 minute presentation on the history of Navy procured AMPSs, the evolution to TAMPS 7.0 followed by a 50 minute 'hands-on' session guided by an instructor. Table 1 contains the PFPS Training Schedule for WTI 1-98. After the initial training but before students are allowed 'hands-on'

** 'Completed' surveys did not necessarily mean that all questions were answered – the results reflect this.

experience with PFPS, all students completed an initial survey. Subsequent training as stated was on a self-paced basis by the student or as the mission planning billets allowed.

Table 1. PFPS Student Training Plan for WTI 1-98

TRAINING TYPE	DIVISION	DATE	TIME	INSTRUCTOR
INITIAL	KC-130	18 SEP 97	1030-1100	CAPT BARR
	ALL ASD	19 SEP 97	1100-1130	CAPT BARR
	F/A-18	***DND		
	AV-8	***DND		
	EA-6	***DND		
HANDS-ON	KC-130	18 SEP 97	1030-1130	CWO GRIGALIS
	AH-1	26 SEP 97	1700-1750	CAPT KENNEDY
	UH-1	29 SEP 97	0700-0750	CAPT BARR
	CH-53	29 SEP 97	1410-1510	CAPT WERNECKE
	CH-46	29 SEP 97	1510-1610	CAPT BARR
	AV-8	***DND		
	F/A-18	***DND		
	EA-6	***DND		

5.1.c Operational Procedures. After PFPS, the Control Point database and the aircraft-specific files were installed, the computers were left on with FalconView and CFPS screens active. As planned, if the computers should be shut down or if either the FalconView or CFPS modules should crash, restarting PFPS and its components proved to be extremely easy. From the Windows 95 desktop, PFPS is started by double-clicking either the CFPS or FalconView icon (Figure 5.1). Once either CFPS or FalconView is running, users can activate the other module by clicking on the respective icon.

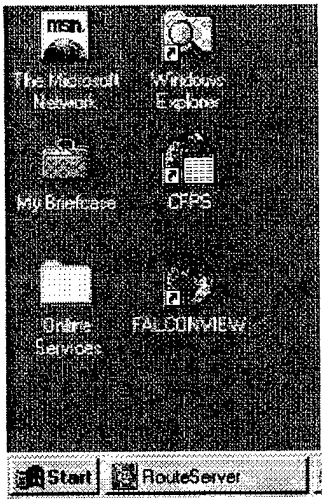


Figure 5.1. Extract from the Windows 95 desktop. Depicted on the desktop are the PFPS and FalconView Icons, as well as the Route Server icon on the lower bar. Users simply select either CFPS or Falconview and the Route Server automatically becomes active to coordinate between modules.

*** Tactical Aviation (TACAIR) pilots did not participate in this QA because the EA-6B pilots mission planned with TEAMS, AV-8B pilots mission planned with MOMS (now called APS), and FA-18 mission planned with F-PLAN, FOREM and TAMPS (on a limited basis).

Figure 5.2 is a view of the Windows 95 desktop with both CFPS and FalconView windows open. From this view, CFPS (left) and FalconView (right) as well as their respective toolbars can be seen. The route on the FalconView map display is what is being automatically updated in the CFPS route card display. It is also important to note the taskbars across the bottom of the display. Although the Route Server is not visible to the user, the presence of the taskbar shows that it is active and is coordinating all open PFPS modules.

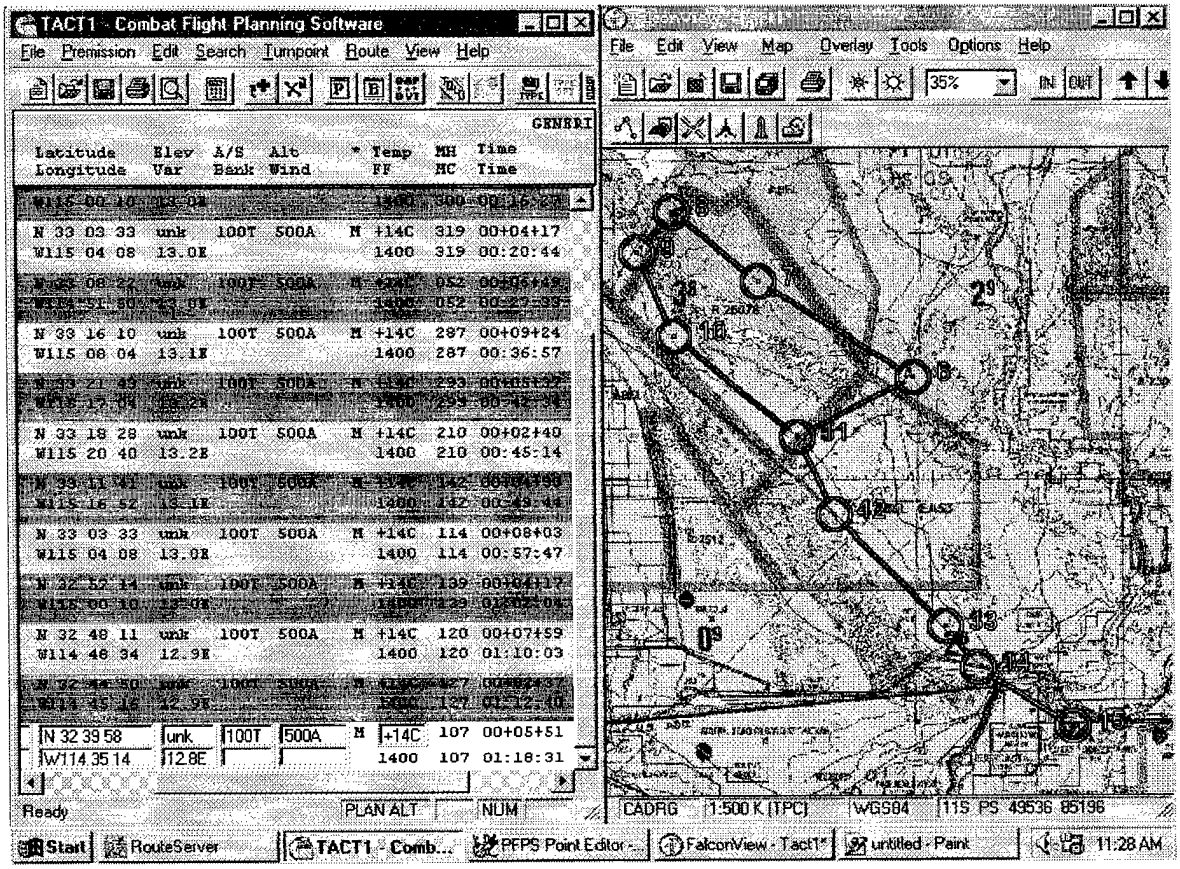


Figure 5.2 PFPS desktop with both CFPS (left) and FalconView (right) windows active. The route on the FalconView map corresponds to the waypoints in the CFPS display. In the bottom of the figure, the Route Server taskbar is visible, signifying that it is active and coordinating the activity of the CFPS, PFPS Point Editor and FalconView modules.

5.2 Instrumentation and Data Collection & Processing. Data was collected via the surveys in Appendixes B and C. Appendix B is the initial survey, which is designed to gather all student demographics. Appendix C is designed to capture opinions on Critical Tactical Issues (CTIs). Table 2 is the survey administration plan for WTI 1-98.

Table 2. Survey Administration Plan for WTI 1-98

EVENT	DATE(S)	REMARKS
Initial Survey	18 - 19 Sep 97	Demographics Only
Baseline Survey	11 - 13 Oct 97	End of Specific Flight Phase
Intermediate Survey	19- 22 Oct 97	End of Common Flight Phase
Final Survey	25 - 27 Oct 97	End of Finex Flight Phase

The MAWTS-1 Aviation Operations Analyst constructed a database of all survey inputs. From this database the analyst conducted data analysis in the form of median (middle), mode (most frequent), maximum and minimum scores for rating scale questions, plots of responses versus key demographic indicators, plots of PFPS utilization and trend analysis for rating scale questions over the three-survey period. The results of the analysis are presented in section **8.0 Results And Discussion.**

5.3 Support Requirements. The following support requirements were required to execute the assessment during WTI 1-98.

5.3.a MAWTS-1

5.3.a.1 ADT&E Department

a. Coordinating Officer/Aviation Operations Analyst:

(1) Co-developed the Qualitative Assessment plan.

(2) Co-developed the Initial and Follow-on Surveys.

(3) Provided analytical assistance to support assessment.

(4) Provided assistance to Project Action Officer in writing final report.

5.3.a.2 Assault Support Department

a. Project Action Officer:

(1) Provided multiple 30 minute introductory briefings on PFPS and the current focus of AMPSs during academics for WTI 1-98 students. Coordinated times/dates with division heads/PFPS Model Managers.

(2) Provided multiple 50 minute PFPS hands-on training sessions scheduled during academics for WTI 1-98 students. Coordinated instructional sessions with division heads/PFPS Model Managers.

(3) Co-developed the Qualitative Assessment plan.

(4) Co-developed the Initial and Follow-on Surveys.

(5) Supervised administering and collection of surveys.

5.3.a.2 Participating Departments

a. Participating Division Heads or Assigned Division PFPS Model Managers:

(1) Scheduled 30 minute introductory briefings on PFPS and the current focus of AMPSs during academics for WTI 1-98 students. Coordinated times/dates with the Project Action Officer.

(2) Scheduled 50 minute PFPS hands-on training sessions schedule during academics for WTI 1-98 students. Coordinated instructional sessions with the Project Action Officer.

(3) Administered and collected surveys for each specific divisions and returned surveys to the Project Action Officer.

5.3.b PMA-233. Provided two Pentium laptop computers and copies of PFPS Version 3.0, Phase 2A (beta).

5.3.b Litton PRC. Provided initial PFPS instructor training at MAWTS-1.

6.0 SAFETY AND SPECIAL PROCEDURES

6.1 Operational Risk Management (ORM). Appendix D contains the ORM plan for this assessment.

6.2 Environmental. This Qualitative Assemsent conducted posed no adverse threat to the environment. No significant environmental degradation or effect is known to be occurring as a result of the assessment procedures; therefore, this action is considered not significant and requires no further environmental documentation.

7.0 ADMINISTRATION AND LOGISTICS

7.1 Manpower Requirements. Manpower requirements for this assessment were limited to the Project Action Officer, the Coordinating Officer/Aviation Operations Analyst and the PFPS Model Managers for each division participating. The manpower requirements were based on the need to conduct pre-assessment training (see paragraph 5.3) and to administer/collect the surveys.

7.2 Schedule/Milestones. The major milestones of this assessment are contained in Table 3.

Table 3. PFPS Qualitative Assessment Milestones

EVENT	DATE(S)	REMARKS
PFPS Training by Litton PRC	16 July 97	Complete
Arrival of PMA-233 Computer Equipment	1 Sep 97	Complete, 2 laptops
Arrival of PFPS Version 3.0	1 Sep 97	Complete
Setup of 3 Computer Suite	15 Oct 97	In work, includes control point & aircraft databases
PFPS Student Training	18 - 29 Sep 97	See Table 1
Surveys	18 Sep - 28 Oct 97	After initial training, Specific, AST and Finex flight phases
Data Analysis/Report Preparation	28 Oct - 15 Dec 97	
Final Report Release	20 Feb 98	Requires C.O. MAWTS-1 Signature

7.3 Personnel Assignment. Key personnel assignments for this assessment and their information is listed in Table 4.

Table 4. Personnel Assignments for the PFPS Qualitative Assessment

RANK	NAME	BILLET	E-MAIL	FAX	PHONE
CAPT	Barr, R. S.	Project Action Officer/ CH-46 Model MGR	barrr@yuma.usmc.mil	DSN 951-2637	DSN 951-3469
MAJ	Sampson, M. T.	Coordinating Officer/ Operations Analyst	sampsonm @yuma.usmc.mil	DSN 951-2637	DSN 951-2498
MAJ	Bennett, J. S.	PMA-233 Rep.	bennettjs.ntprs @navair.navy.mil	DSN 757-8020	DSN 757-7987
CIV	Medieros, J.	PFPS Software Engineer	medieros@eglin.af.mil	DSN 872-6379	DSN 872-2350
CAPT	Wernecke, S.	CH-53 Model MGR	werneckes @yuma.usmc.mil	DSN 951-2637	DSN 951-2643
CAPT	Kennedy, B.	AH-1 Model MGR	kennedyb @yuma.usmc.mil	DSN 951-2637	DSN 951-2967
CAPT	Vanderwerff, J.	UH-1 Model MGR	vanderwerffj @yuma.usmc.mil	DSN 951-2637	DSN 951-2132
CWO	Grigalis, E. A.	KC-130 Model MGR	grigalise @yuma.usmc.mil	DSN 951-2637	DSN 951-3570

7.4 Reports. This assessment will be complete once this final report is signed by the Commanding Officer and the distribution list has received their copies. Interim reporting will be done only on software discrepancies for this assessment. In the instance of a software discrepancy, the developer will be contacted as soon as possible to ensure the final version of PFPS 3.0 is debugged as much as possible before release to the fleet. Appendix E is the Reports Deliverables Plan that was signed by all major parties involved in this assessment.

7.5 Project Security. This assessment, its computer hardware, software and any reports are or will be classified 'Unclassified'.

8.0 RESULTS AND DISCUSSION Overall participation in the assessment by the supporting departments was good with roughly 40 respondents contributing. There were, however, some lapses in participation for the baseline and intermediate survey (Figure 8.1) which prompted 'rolling up' the results so that responses to each questions were not separated for trend analysis across the assessment period. The lack of at least 30 complete sets of surveys prevented higher level analysis under the assumptions of the Central Limit Theorem, however, the data was still acceptable for presentation in basic statistical terms. Most of the diagrams in this section involving ratings provide the ***Median*** (the middle value of all values placed in order) and the ***Mode*** (most frequent value chosen) as centrality parameters, and the ***Max*** (maximum value chosen) and the ***Min*** (minimum value chosen) to present the range of responses given. The rankings section below also includes the ***Mean*** (average of all values) which is a permissable centrality parameter in that case.

PFPS usage prior to the assessment and during the assessment was recorded to provided insight into the PFPS experience level of the respondents at the outset as well as the amount of PFPS usage during the assessment driving the responses of the participants. The respondents were regrouped into USMC Rotary Wing, USMC KC-130 and USAF Rotary Wing to better highlight the different experience and usage levels. Figure 8.2, PFPS Usage, reflects that those most familiar with PFPS at the outset (USAF Rotary Wing), tended to use PFPS the most during the assessment and that average usage across all groups remained fairly constant. It is important to note that KC-130 participation in the Intermediate Survey was not available and was recorded as a zero.

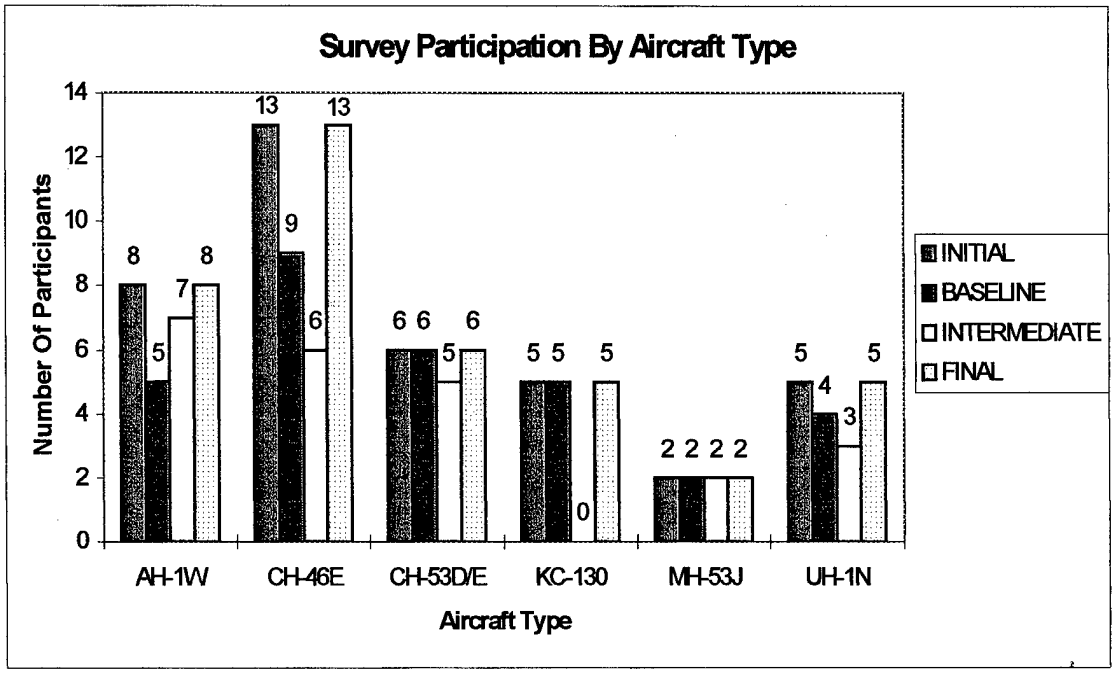


Figure 8.1. Survey Participation by Aircraft Type. Participation is depicted by aircraft type and then broken out within the type to show the number of respondents who participated in each phase of the survey. The most respondents participating at any one time was 41 and the least was 23.

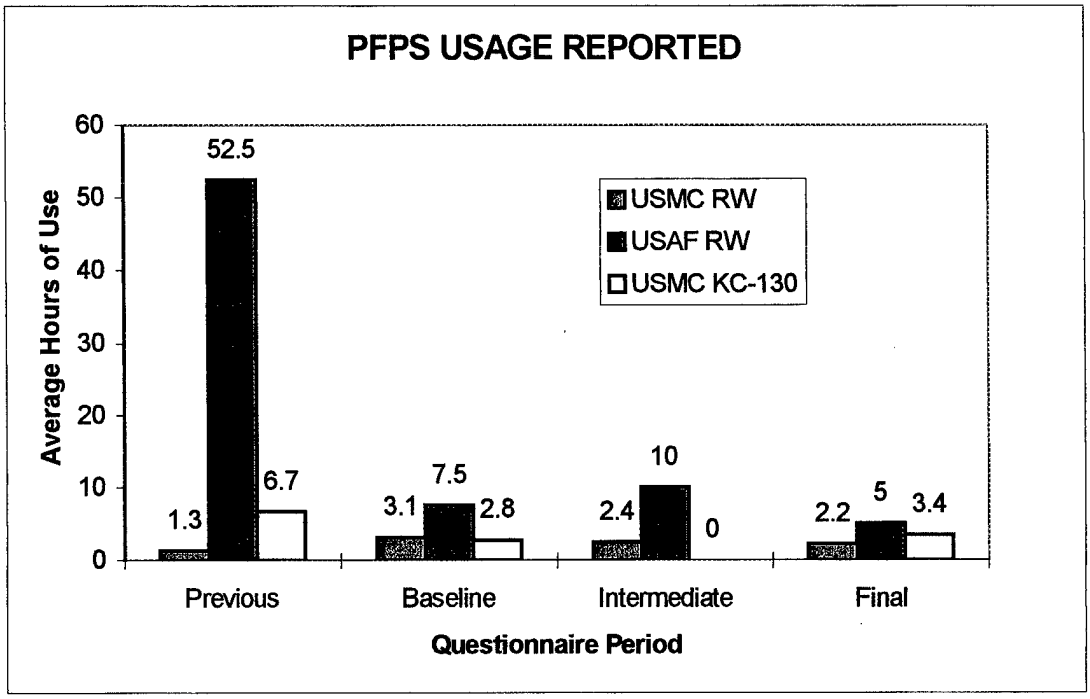


Figure 8.2. PFPS Usage Reported (Average Hours). Respondents were regrouped into USMC RW, USMC KC-130 and USAF RW to better highlight the differences in usage prior to the assessment ('Previous') and up to the Baseline, Intermediate and Final surveys. The graph reflects that those most familiar with PFPS at the outset (USAF Rotary Wing), tended to use PFPS the most during the assessment and that average usage across all groups remained fairly constant (Note: USMC KC-130 usage between the Baseline and Intermediate survey was not available and is therefore recorded as 0).

8.1. Background. Basic demographics of the survey respondents were recorded in the background section of the Initial Survey. Figure 8.3, Respondent Experience Levels, depicts the Minimum, Mean (average) and Maximum Values for Respondent Age, Years of Service, Years of Operational Flying and Hundreds of Military Flight Hours. In the opinion of the Project Action Officer, the respondents in this survey presented a good crossection of the senior enlisted to field grade military aviator.

In Figure 8.4, Computer Experience, Respondents were allowed to select all sources of their computer experience. The results reflect that most had PC experience (68%) with Network and Macintosh coming in a distant second (15%) and third (11%) respectively. None of the respondents selected Unix, 'Other' or 'No' computer experience as their top 3, however, in later questions, some respondents reported having worked with the Unix operating system. In Figure 8.4., Operating System Experience, respondents selected all types of operating systems they had experience with. Most had Windows 95/97/NT experience (54%) with Windows 3.1 coming in a close second (30%) and Macintosh coming in a distant third (9%). In Figure 8.5, Computer Training History, respondents selected where they received most of their computer training. Almost half of the respondents gained most of their experience from on-the-job training in the Department of Defense (48%). Home computing was a close second (42%) and College Degree Requirement was a distant third (9%). Few (3%) had DOD Formal Training.

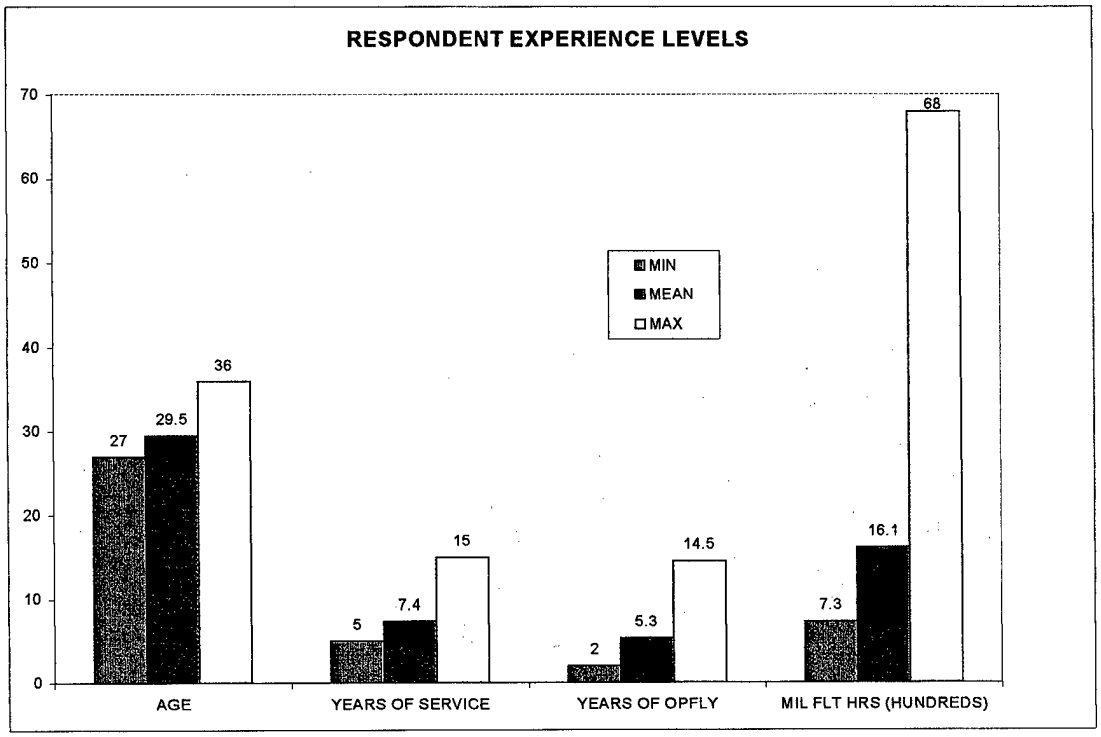


Figure 8.3. Respondent Experience Levels. Depicted are the Minimum, Mean (average) and Maximum Values for Respondent Age, Years of Service, Years of Operational Flying and Hundreds of Military Flight Hours. The respondents in this survey presented a good crossection of the senior enlisted to field grade military aviator.

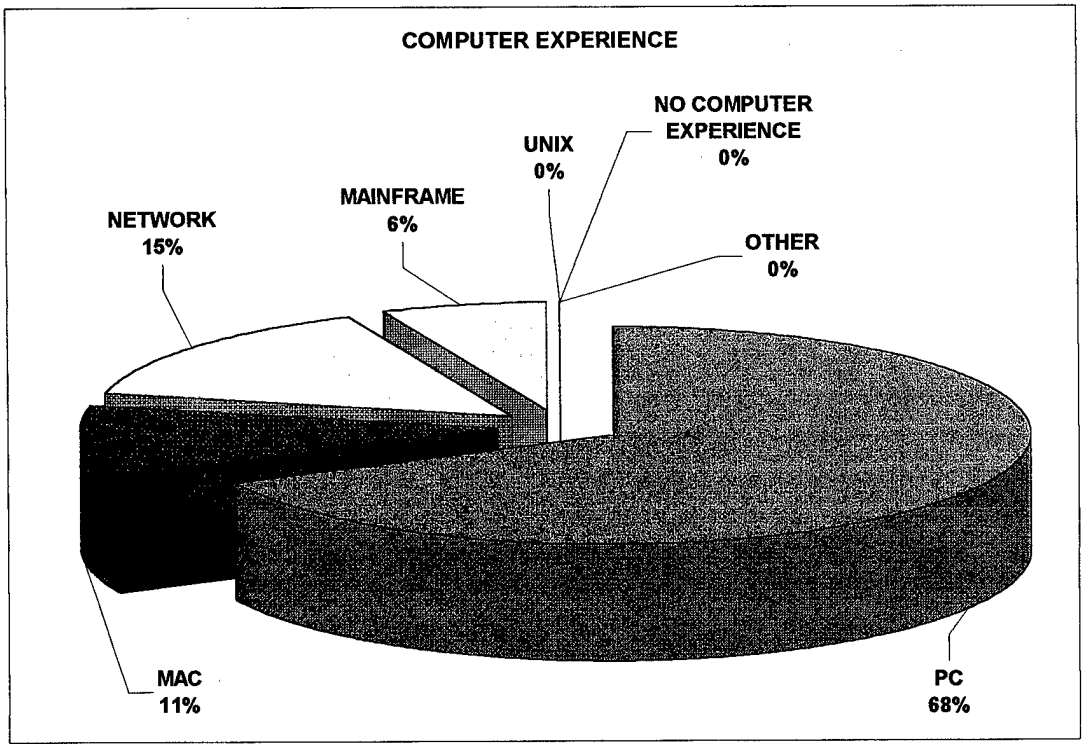


Figure 8.4. Computer Experience. Respondents selected all types of computers they had experience with. Most had PC experience (68%) with Network and Macintosh coming in a distant second (15%) and third (11%) respectively. None of the respondents selected Unix, 'Other' or 'No' computer experience here.

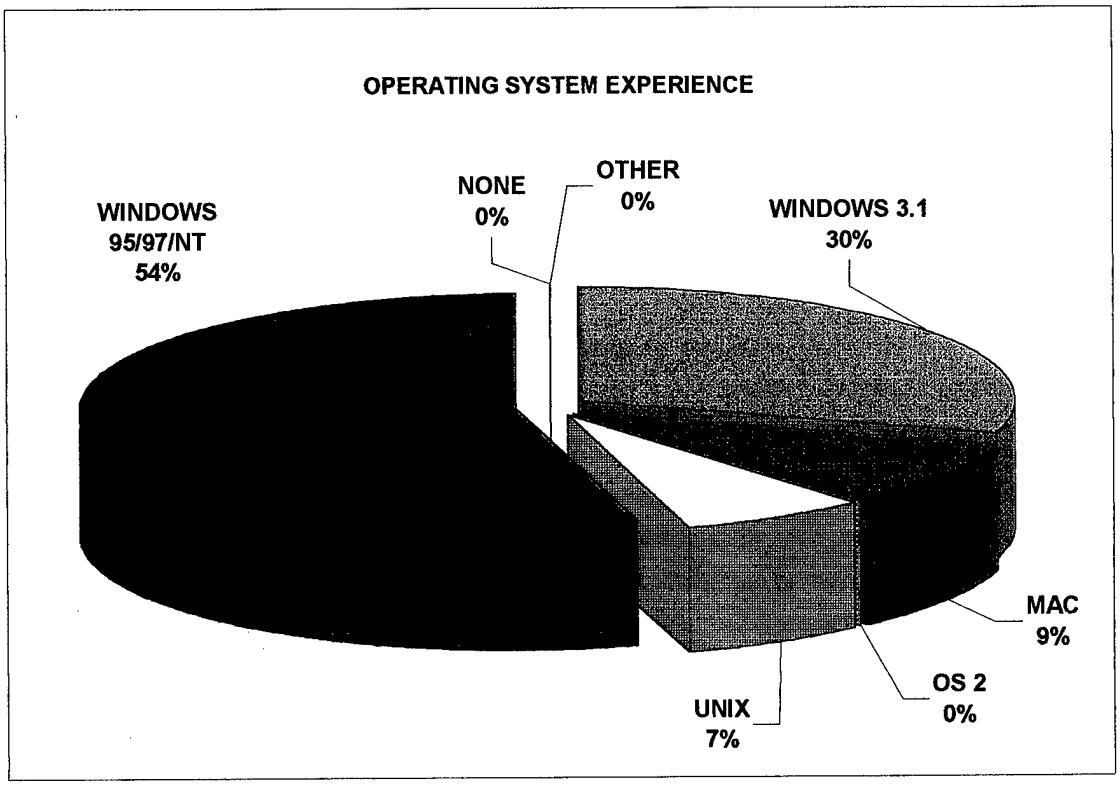


Figure 8.5. Operating System Experience. Respondents selected all types of operating systems they had experience with. Most had Windows 95/97/NT experience (54%) with Windows 3.1 coming in a close second (30%) and Macintosh coming in a distant third (9%) (Note: The Unix operating system appears here when it was not indicated in Figure 8.3).

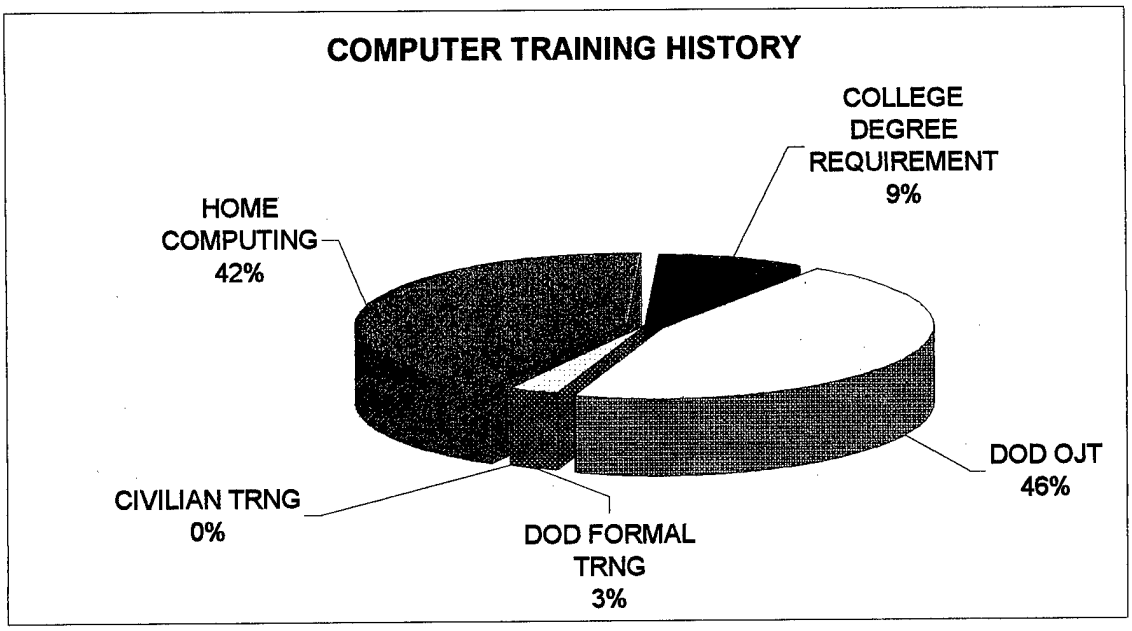


Figure 8.6. Computer Training History. Respondents selected where they received most of their computer training. Almost half of the respondents gained most of their experience from on-the-job training in the Department of Defense (48%). Home computing was a close second (42%) and College Degree Requirement was a distant third (9%). Few (3%) had DOD Formal Training and none had prior training in a civilian job.

In Figure 8.7, Previous AMPS Experience, respondents selected all sources of AMPS experience they had prior to the assessment. Of the AMPS's available in the DOD, respondents had most experience with FPLAN (30%). TAMPS ran a close second (25%) and PFPS a distant third (11%). Nine percent of the respondents (approximately 4) had no AMPS experience. Fifty percent of respondent experience was with FPLAN, PFPS and FalconView collectively. These programs are PC-based and have all been developed by the 46th Test Squadron, based at Eglin AFB. Figure 8.8 depicts How AMPS experience was acquired. Respondents selected whether their AMPS experience was acquired under one or a combination of Training, Exercise or Operational conditions. Most experience was acquired under training conditions (59%), with exercise conditions second (26%) and operation conditions a distant third (15%). In the opinion of the Project Action Officer, the percentages realistically reflect an average DOD Aviator's actual flying experience - mostly training, a lesser amount of exercises and a modest amount of operational experience.

In Figure 8.9, Squadron Dedicated AMPS Computer, respondents indicated what was the highest level of computer dedicated to mission planning in their squadron. Most (56%) reported a 586 as the highest and 486 (46%) as the second highest. None of the respondents selected 386 or 'No dedicated mission planning computer'. In the opinion of the Project Action Officer, the respondents misunderstood the question because numerous reports from 'Fleet Support' indicate there was no computer in the ready room and computers with mission planning programs, were 'multi-role' or not dedicated to mission planning. The Project Action Officer interprets the responses to indicate the highest level of computer in the unit, indicating that units are able to purchase the most up-to-date systems – whether or not they will do this for mission planning, remains to be seen.

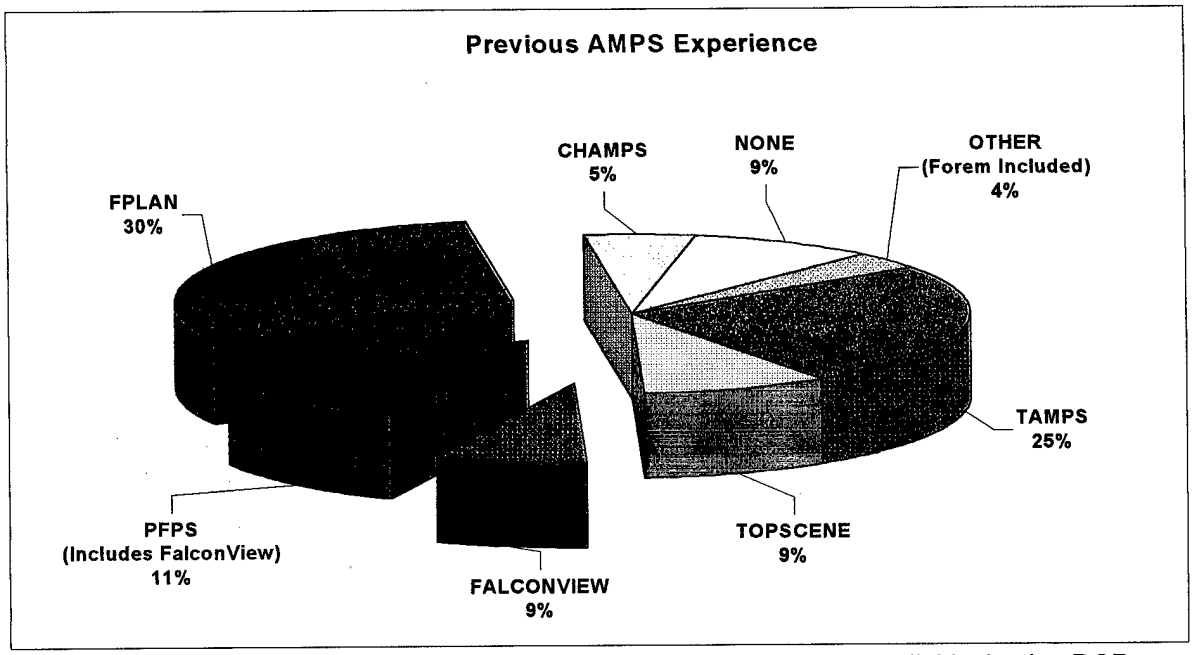


Figure 8.7. Respondent AMPS Experience. Of the AMPS's available in the DOD, respondents had most experience with FPLAN (30%). TAMPS ran a close second (25%) and PFPS a distant third (11%). Nine percent of the respondents (approximately 4) had no AMPS experience. Fifty percent of respondent experience was with FPLAN, PFPS and FalconView collectively. These programs are PC-based and have all been developed by the 46th Test Squadron, based at Eglin AFB.

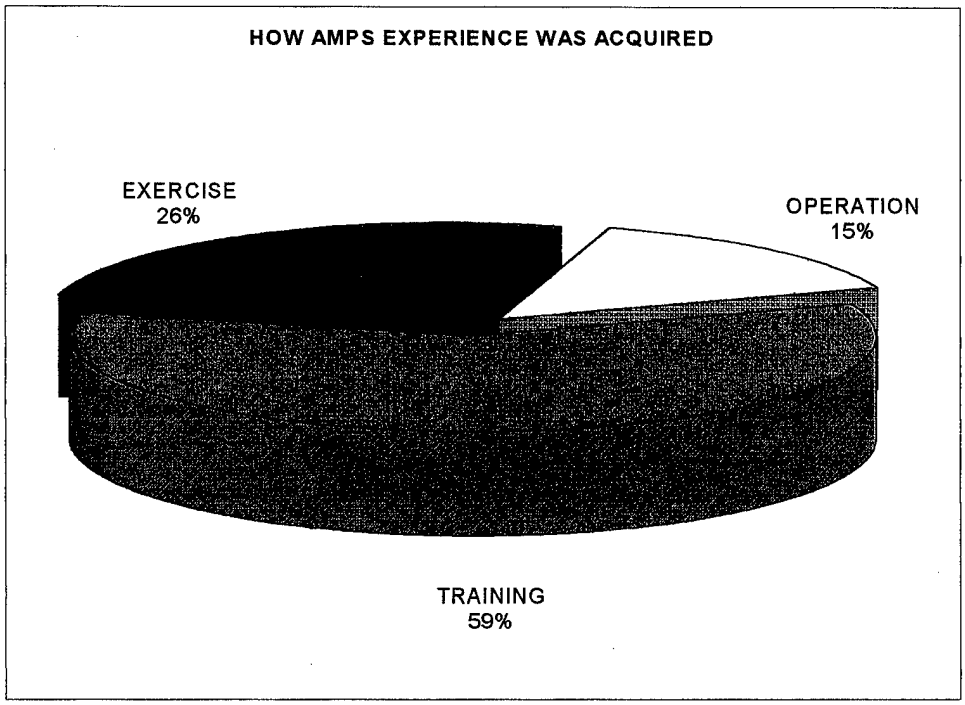


Figure 8.8. How AMPS Experience Was Acquired. Respondents selected whether their AMPS experience was acquired under one or a combination of Training, Exercise or Operational conditions. Most experience was acquired under training conditions (59%), with exercise conditions second (26%) and operational conditions a distant third (15%). The percentages realistically reflect an average DOD aviator's actual flying experience - mostly training, a lesser amount of exercises and a modest amount of operational experience.

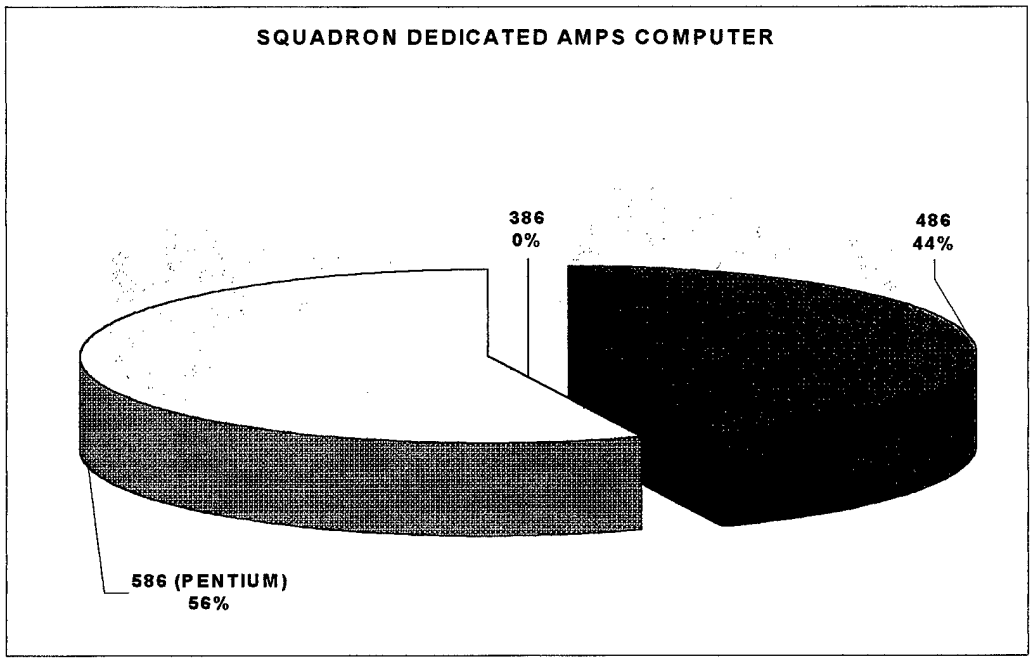


Figure 8.9. Squadron Dedicated AMPS Computer. Respondents indicated what was the highest level of computer dedicated to mission planning in their squadron. Most (56%) reported a 586 as the highest and 486 (46%) as the second highest. None of the respondents selected 386 or 'No dedicated mission planning computer'. Respondents may have mistakenly reported the highest level of computer available in their squadron.

8.2. Training. Below is an excerpt from the section of the survey on training (Median scores boxed in red). Below the excerpt is Figure 8.10, the results from the first part of that section. In the first part, respondents were asked to use the rating scale provided to rate their opinion of the level of **adequacy** experienced during each PFPS training evolution by circling a corresponding number.

In Figure 8.10, Training Ratings, the Mode and Median for each question reflect that respondents thought the initial training was generally adequate but that they were neutral on whether or not the OJT or 'self-paced' training time was adequate. The Max and Min for each question reflect that at least one respondent felt all the training was very adequate or better while at least one respondent felt the training was inadequate to extremely inadequate. During the Weapons and Tactics Instructor Course, the time for both formal and 'self-paced' training is limited but this limit, however artificial, is similar to situations pilots may face during fleet introduction of new software or a new weapon system upgrade.

	EXTREMELY INADEQUATE			NEUTRAL			EXTREMELY ADEQUATE
1) The 30 minute Introduction to PFPS.	1	2	3	4	[5]	6	7
2) The 50 minute 'Hands-On' Presentation.	1	2	3	4	[5]	6	7
3) On-the-Job (OJT) training time availability.	1	2	3	[4]	5	6	7

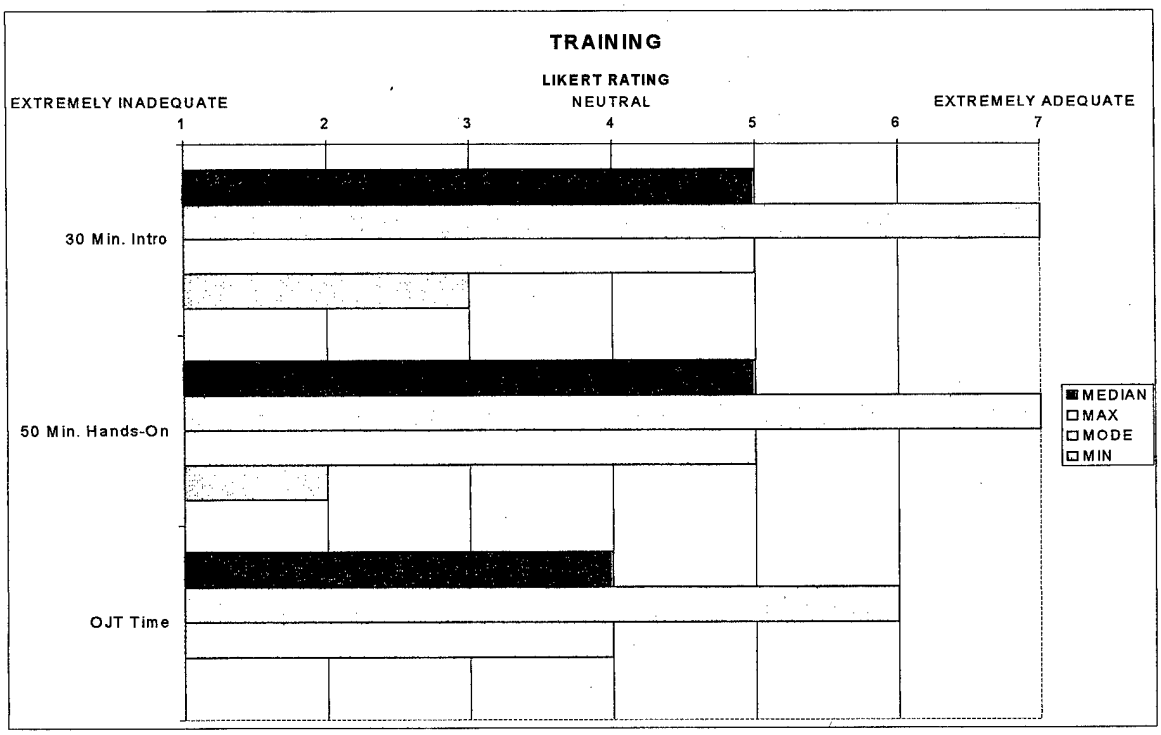


Figure 8.10. Training Ratings. The Mode and Median for each question reflect that respondents thought the initial training was generally adequate but that they were neutral on whether or not the OJT or 'self-paced' training time was adequate. The Max and Min for each question reflect that at least one respondent felt all the training was very adequate or better while at least one respondent felt the training was inadequate to extremely inadequate. **"Not enough training time" is more of a reality than an artificiality.**

In the Baseline Survey only, respondents were asked:

4) With your training in PFPS *up to this point*, would you be comfortable instructing your squadron on PFPS use? (Circle one) Yes No

Figure 8.11 indicates that after an average of only 6.1 hours of training time since the start of the assessment, 64% of the respondents felt that they would feel comfortable instructing their squadron in the use of PFPS while 36% would not. Although this question was not asked on the two subsequent surveys, it is the opinion of the Project Action Officer that, based on the results of the questions on training above, on observations and on interviews, that the number selecting 'Yes' would have increased into the 90th percentile or higher by the final survey.

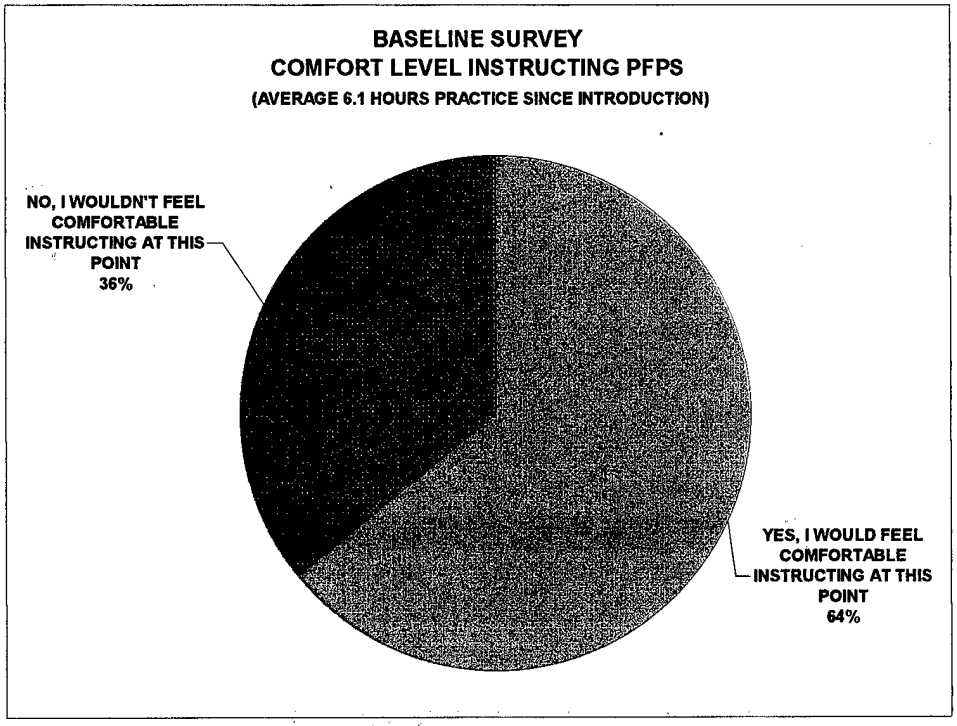


Figure 8.11. Comfort Level Instructing PFPS. Respondents were asked to answer "Yes" or "No" if they would feel comfortable, with their training up to that point (the Baseline Survey), instructing their squadron in PFPS. After an average of only 6.1 hours of training time since the start of the assessment, 64% of the respondents felt that they would feel comfortable instructing their squadron in the use of PFPS while 36% did not.

8.2. Human Factors. Below is an excerpt from the section of the survey on Human Factors (Median scores boxed in red ☐). Below the excerpt is Figure 8.12, the results from that section. Respondents were asked to rate their opinion of the level of **difficulty** experienced while using the annotated human-machine interfaces in PFPS. The Median and Mode for all questions was five or better, reflecting that respondents found that all human machine interfaces were 'Easy' to 'Very Easy' to use. Minimum values for all questions reflected that none of the areas were 'trouble free'. Question 9, editing an overlay, received the lowest median (5) and the lowest minimum (1) rating, because changing aircraft configuration is one of hardest tasks in PFPS due to it requiring multiple system administrator-level changes. Only C-130 and F/A-18 flight performance modules were available at the time of the assessment, all other aircraft required the multiple modifications.

	EXTREMELY HARD			NEUTRAL			EXTREMELY EASY
1) Working with available PC/Laptop hardware (e.g., mouse, keyboard, touchpad).	1	2	3	4	5	[6]	7
2) Working with available printer hardware	1	2	3	4	5	[6]	7
3) Working with the PFPS Graphical User interface (GUI) (i.e., Desktop, icons toolbars, windows, etc.).	1	2	3	4	5	[6]	7
4) PFPS 'boot-up' sequence.	1	2	3	4	5	[6]	7
5) Opening a CFPS window.	1	2	3	4	5	[6]	7
6) Opening a FalconView window.	1	2	3	4	5	[6]	7
7) Opening a saved Overlay File (e.g., route, threat, waypoint, etc.).	1	2	3	4	5	[6]	7
8) Saving an overlay file.	1	2	3	4	5	[6]	7
9) Editing an overlay file (e.g., change route, update threat, change aircraft configuration).	1	2	3	4	[5]	6	7
10) Printing PFPS products.	1	2	3	4	5	[6]	7

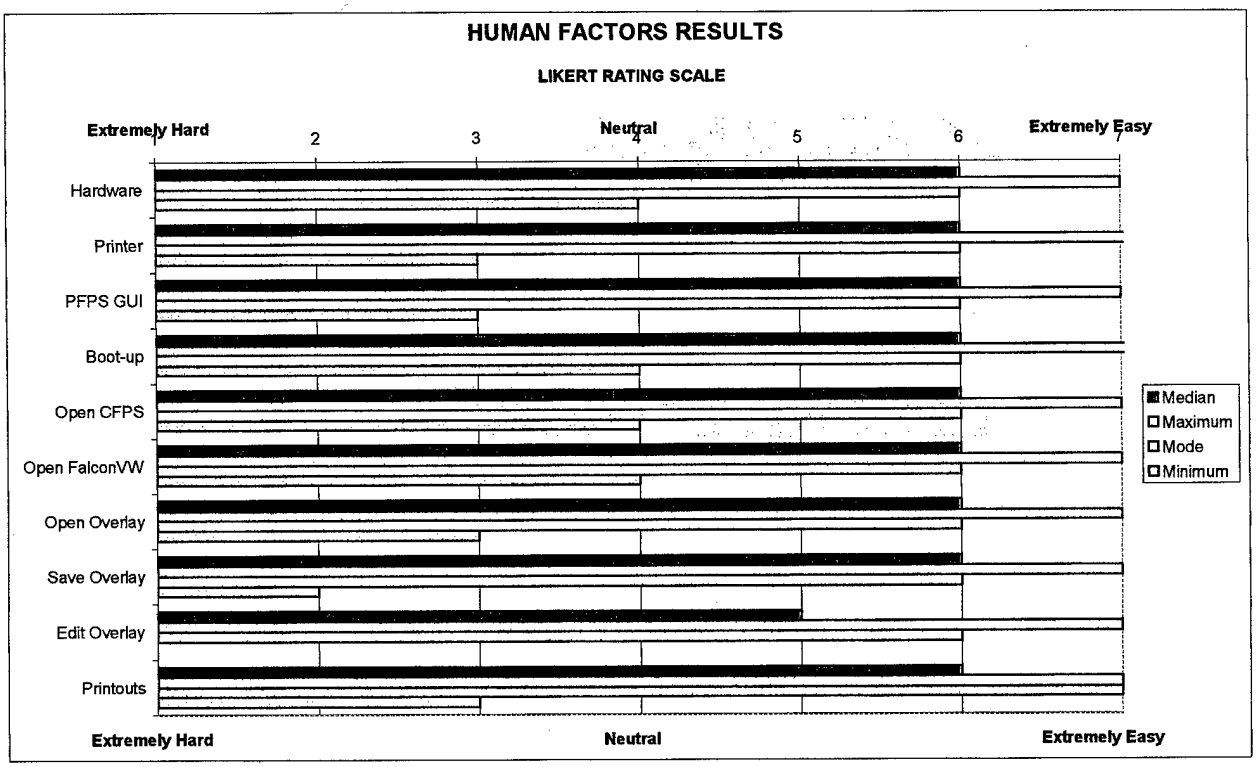


Figure 8.12. Human Factors results. The Median and Mode for all questions was five or better, reflecting that respondents found that all human machine interfaces were 'Easy' to 'Very Easy' to use. Minimum values for all questions reflected that none of the areas were 'trouble free' as at least one person rated each interface Neutral or less. Changing an overlay (Question 9) received the lowest median (5) and the lowest minimum (1) rating, possibly reflecting an interface requiring improvement.

8.3 Documentation. Below is an excerpt from the section of the survey on documentation (Median scores boxed in red ☐). Below the excerpt is Figure 8.13, the results from that section. Respondents were asked to rate their opinion of the level of **adequacy** experienced while referring to the following documentation sources in PFPS. A hard-copy user's guide was not available at the time of the assessment, accordingly the excerpt and Figure 8.13 have been modified to reflect this. The Median and Mode for Question 2 (online help) was 4, reflecting that respondents found the documentation was niether 'Adequate' nor 'Inadequate'. The Median and Mode for Question 3 (pull-down/pop-up menus) was 5, reflecting that respondents found them adequate. Minimum and Maximum values for all questions reflected that some respondents found the documentation 'extremely adequate' while others found it to be 'Inadequate'. The ratings indicate that documentation needs improvement.

	EXTREMELY INADEQUATE			NEUTRAL			EXTREMELY ADEQUATE
2) PFPS online 'help'.	1	2	3	[4]	5	6	7
3) Descriptions/Instructions accompanying a pull-down/pop-up menu item once it is selected (e.g., description box for map scale choices, etc.).	1	2	3	4	[5]	6	7

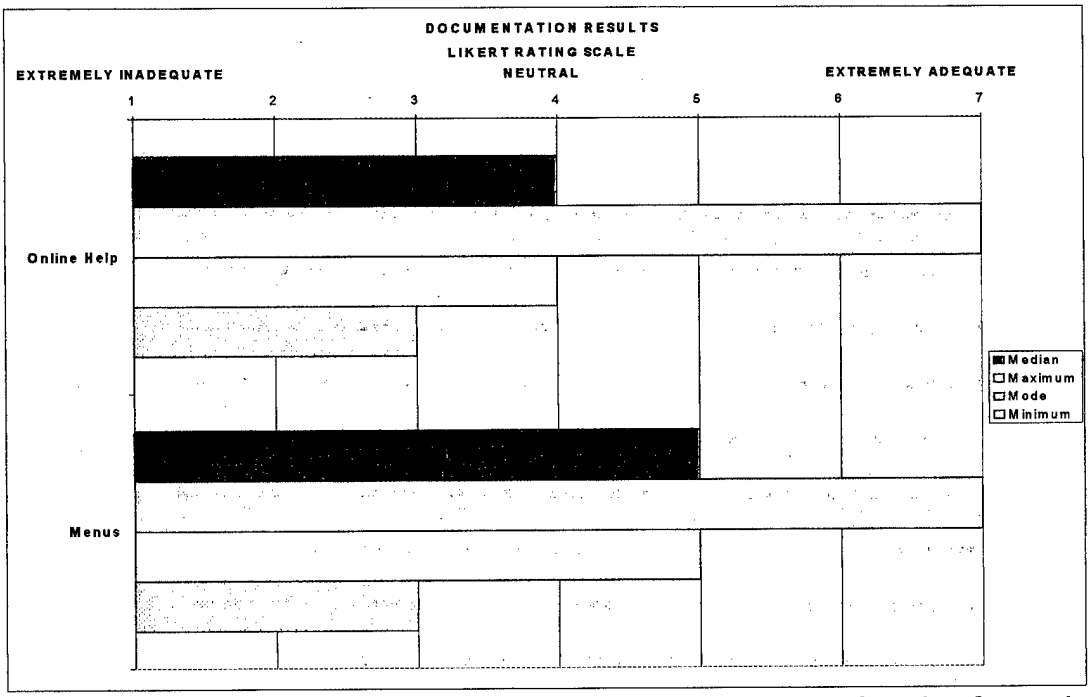


Figure 8.13. Documentation results. The Median and Mode for Question 2 was 4, reflecting respondents finding the documentation niether 'Adequate' nor 'Inadequate'. The Median and Mode for Question 3 was 5, reflecting that respondents found it adequate. Minimum and Maximum values for all questions reflected that some respondents found the documentation 'extremely adequate' while others found it to be 'Inadequate'.

8.4 Compatibility. Below is an excerpt from the section of the survey on Compatability (Median scores boxed in red ☐). Below the excerpt is Figure 8.14, the results from that section. Respondents were asked to rate their opinion of the level of **compatibility** of PFPS and the stated requirement. The Median and Mode for all questions was five to six, reflecting that most

respondents found PFPS 'Compatible' to 'Very Compatible' with the stated functions. Minimum and maximum values for all questions reflected that at least one respondent found PFPS 'extremely compatible' while at least one found certain areas to be 'Incompatible'. The results indicate that PFPS is compatible with the stated funcitons.

	EXTREMELY INCOMPATIBLE			NEUTRAL			EXTREMELY COMPATIBLE
1) PFPS with the Windows 95 operating system.	1	2	3	4	5	[6]	7
2) CFPS module with FalconView module.	1	2	3	4	5	[6]	7
3) PFPS print options with available printer.	1	2	3	4	5	[6]	7
4) PFPS printed products (i.e., route cards, maps) with briefing/smartpack requirements.	1	2	3	4	[5]	6	7
5) PFPS *Threat* Menu selections with mission planning requirements.	1	2	3	4	5	[6]	7
6) PFPS *Aircraft Weight & Performance* Menu selections with mission planning requirements.	1	2	3	4	[5]	6	7
7) PFPS *Route Construction* menu selections with mission planning requirements.	1	2	3	4	[5]	6	7
8) PFPS *Airspace Overlay* menu selections with mission planning requirements.	1	2	3	4	[5]	6	7

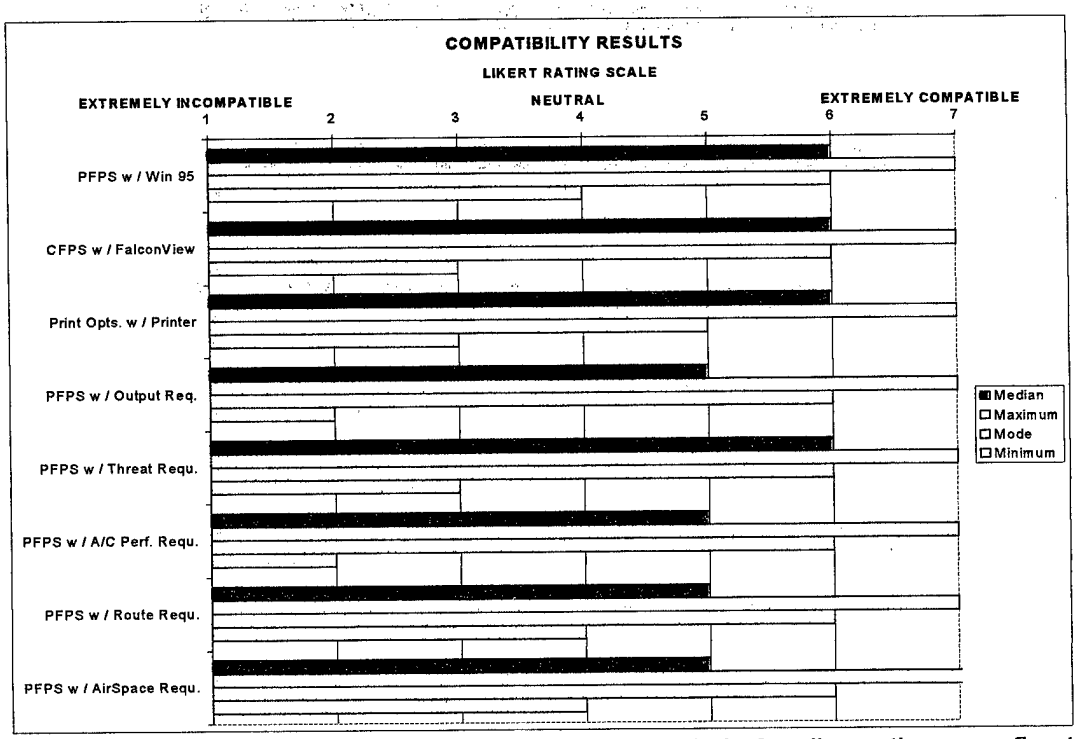


Figure 8.14. Compatibility results. The Median and Mode for all questions was five to six, reflecting that most espondents found PFPS 'Compatible' to 'Very Compatible' with the stated functions. Minimum and maximum values for all questions reflected that at least one respondent found PFPS 'extremely compatible' while at least one found certain areas to be 'Incompatible'. The results indicate that PFPS is compatible with the stated funcitons.

8.5 Reliability. Below are two excerpts from the section of the survey on Reliability (Median scores boxed in red ☐). Below the first excerpt is Figure 8.15, the results from the first section. In the first section, respondents were asked to rate their opinion of the level of **reliability** experienced while using PFPS. Figure 8.15, reflects that the Median and Mode for all questions was 6 which means respondents found the stated modules very reliable. Min values ranged from 3, unreliable to 4, neutral, while max values were all 7's, extremely reliable.

	EXTREMELY UNRELIABLE			NEUTRAL			EXTREMELY RELIABLE
1) The CFPS module.	1	2	3	4	5	[6]	7
2) The FalconView module.	1	2	3	4	5	[6]	7
3) The Route Server.	1	2	3	4	5	[6]	7
4) PFPS running on Windows 95.	1	2	3	4	5	[6]	7

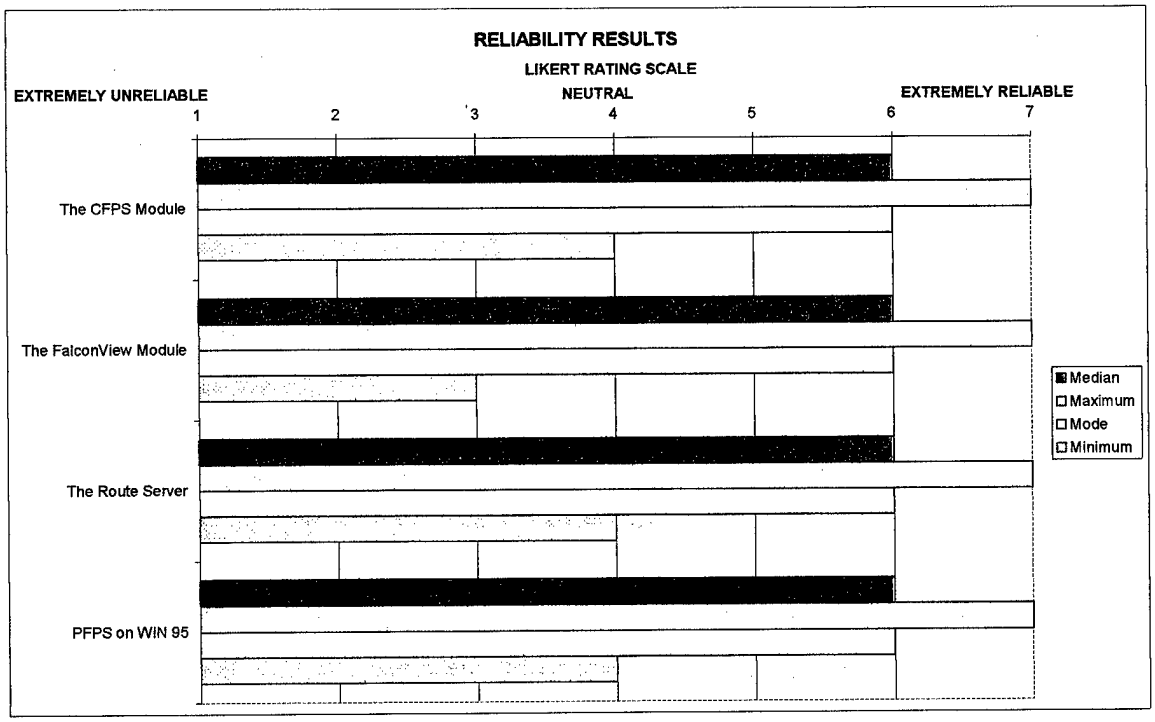


Figure 8.15. Reliability. The Median and Mode for all questions was 6, or that respondents found the stated modules very reliable. Min values ranged from in unreliable to neutral while max values were all extremely reliable.

In the second part of the Reliability section, a more quantitative measurement of reliability was measured in the form of 'crashes per session' for PFPS and the Windows 95 operating system. Although this assessment was not focused on the Windows 95 operating system, this measure was key to highlighting the reliability of PFPS while also providing an alternate measure of its compatibility with Windows 95.

Below is the excerpt from the second reliability section of the survey and below that are Figures 8.16 and 8.17, the results. Figure 8.16 shows that, in 30 sessions, users experienced no crashes from either PFPS or the Windows 95 operating system and, on another 13 sessions (for

a total of 43 sessions), Windows 95 had no crashes. In 18 sessions, PFPS had only one crash and, in 4 other sessions, Windows 95 also had only one. Only once was there three crashes in a session with PFPS and none with Windows 95. Only once were six crashes recorded in one session for each (in the opinion of the Project Action Officer, this report, from the same respondent, was questionable). Figure 8.17, PFPS Post-Crash Results, shows that, when PFPS did crash, respondents were able to continue 20% of the time but were forced to end the session 12% of the time. Another 12% of the time, respondents had mixed results and either were able to continue or the session ended completely. Again, in more than half of the sessions, respondents had no failures from PFPS. In light of these results, PFPS is determined to be reliable.

5) While using PFPS, approximately how many times *per session* did PFPS or one of its modules crash? (stop working)

6) Did these crashes end your session or were you able to restart PFPS or the failed module(s) and continue? (Circle one)

Yes, session ended No, session continued Mixed No Crashes

7) While you were using PFPS, approximately how many times *per session* did Windows 95 crash? (stop working) _

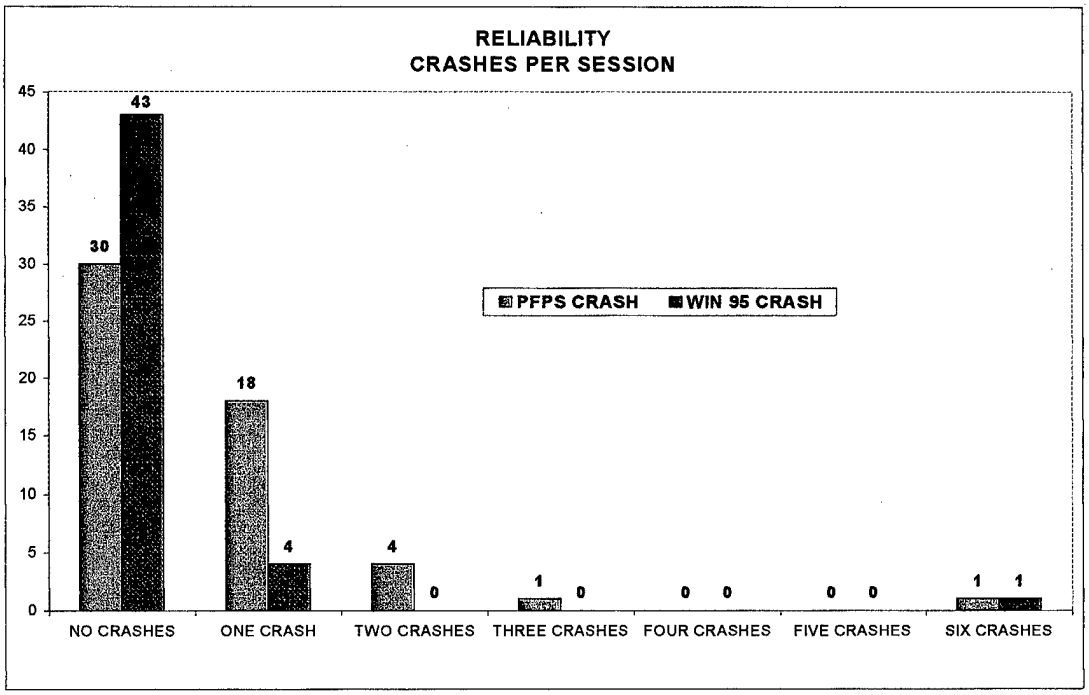


Figure 8.16. Crashes Per Session (PFPS and WIN 95). The results show that in 30 sessions, users experienced no crashes from either PFPS or the Windows 95 operating system. In 18 of the sessions, PFPS had only one crash and, in 4 of the sessions, Win 95 also had only one. Only once was three crashes in a session recorded with PFPS and none with Windows 95. Only once were six crashes recorded in one session for each (suspect).

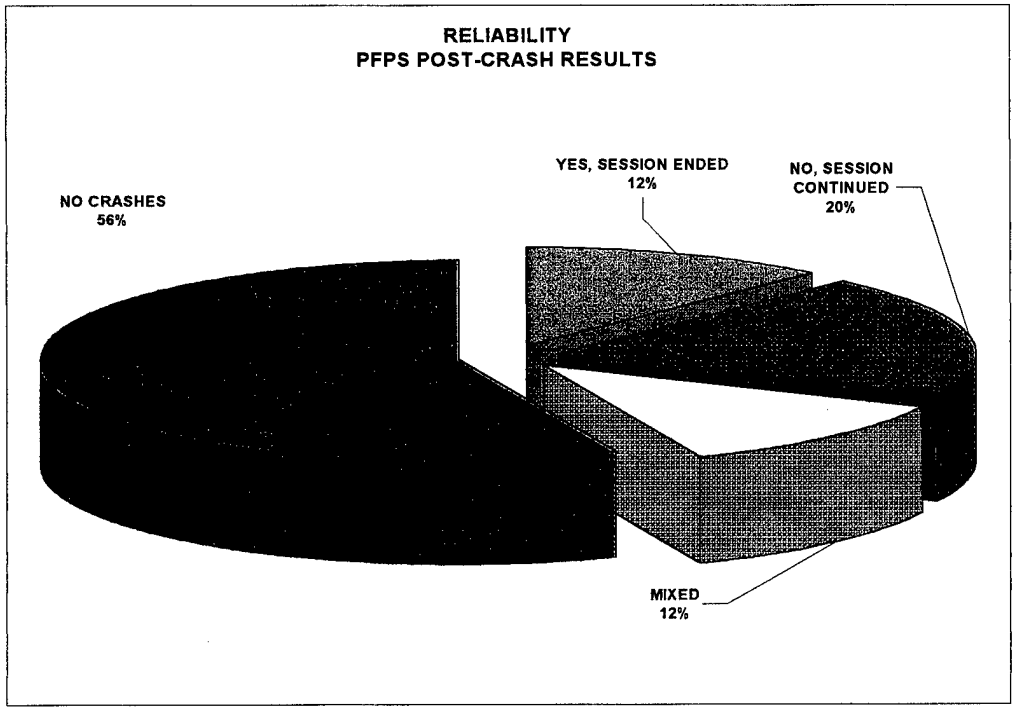


Figure 8.17. PFPS Post-Crash Results. In the times when PFPS did crash, respondents were able to continue 20% of the time but were forced to end the session 12% of the time. Another 12% of the time, respondents had mixed results and either were able to continue or the session ended. Again, in more than half of the sessions, respondents had no failures.

8.6 Maintainability. Below is an excerpt from the section of the survey on Maintainability. Below the excerpt is Figure 8.18, the results from that section. Since PFPS will eventually be introduced 'fleetwide', the maintainability questions extended beyond the assessment to project the respondents opinion of what may occur during the introduction. While most respondents felt that they could install PFPS and access technical support, few felt that they could troubleshoot problems with PFPS. However, few respondents felt that PFPS required a WTI to install PFPS and train other pilots in its use. Overall, PFPS is determined to be maintainable at the squadron level and the computer background of the respondents here is seen as a multiplier – like the Windows/Windows 95 applications most are used to, PFPS requires a minimal amount of special training to operate and maintain it.

1) If the minimum required computer (100 megahertz, Pentium PC, running Windows 95) was available to your unit, would you be comfortable installing/reinstalling PFPS and setting up the required databases and modules for your unit's use? (Circle one) Yes No Don't Know

2) With your training in PFPS up to this point, do you feel comfortable troubleshooting PFPS software malfunctions? (Circle one) Yes No Don't Know

3) With your training in PFPS up to this point, could you locate information on how to access technical support? (Circle one) Yes No

4) With your training in PFPS up to this point, do you think PFPS requires a WTI to train other unit personnel in its use? (Circle one) Yes No Don't Know

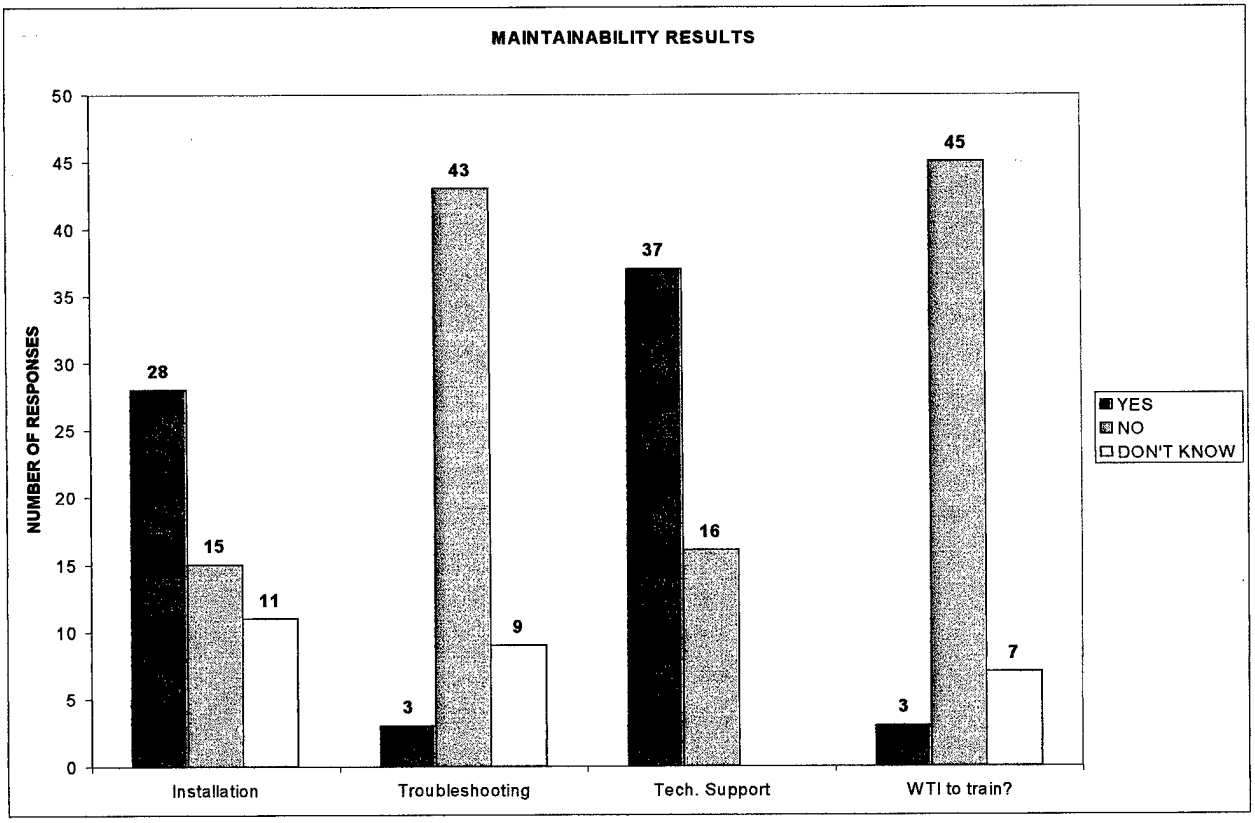


Figure 8.18. Maintainability Results. While most respondents felt that they could install PFPS and access technical support, few felt that they could troubleshoot problems with PFPS. Also, few respondents felt that PFPS required a WTI to install PFPS and train other pilots in its use. Overall, PFPS is determined to be maintainable at the squadron level, with the maintainability similar to that of other Windows/Windows 95-based applications.

8.7 General. Below are four excerpts from the section of the survey covering the General Suitability Issues (Median scores boxed in red ☐ for the first excerpt). Below the first excerpt is Figure 8.19, the validity rankings of each of seven proposed functionality enhancements. Respondents were asked to rate the validity of each functionality enhancement as it concerned their community. Median and Mode ratings for all Functionality Enhancements were Neutral to Valid with the Takeoff and Landing Data (TOLD) and Hover Mode Tool receiving the lowest Mode ratings (4). The low rating of the Hover Mode Tool can be partially attributed to the KC-130 participation in the assessment – no need to hover there. Mission Data Loader (MDL) received the highest Median and Mode ratings (7). Maximum values reflect that one or more respondents found each enhancement valid while minimum values reflected that, , unlike the other enhancements, Map Scan and Access To Other Than NIMA Compressed Graphics were never rated Invalid.

	INVALID			**NEUTRAL**			**VALID**
1) Mission Data Load (MDL/Brick) capability.	1	2	3	4	5	[6]	7
2) Aircraft Specific Flight Performance Modules. (FPMs)	1	2	3	4	[5]	6	7
3) Takeoff and Landing Data (TOLD) weight and balance calculation capability.	1	2	3	4	[5]	6	7
4) Hover Mode Tool.	1	2	3	[4]	5	6	7
5) Circumlinear (serpentine) route drawing tool.	1	2	3	4	5	[6]	7
6) Capability to scan in any map and use it.	1	2	3	4	5	[6]	7
7) Capability to access other than strictly NIMA-produced Compressed Arc Digital Raster Graphics(CADRG) files.	1	2	3	4	5	[6]	7

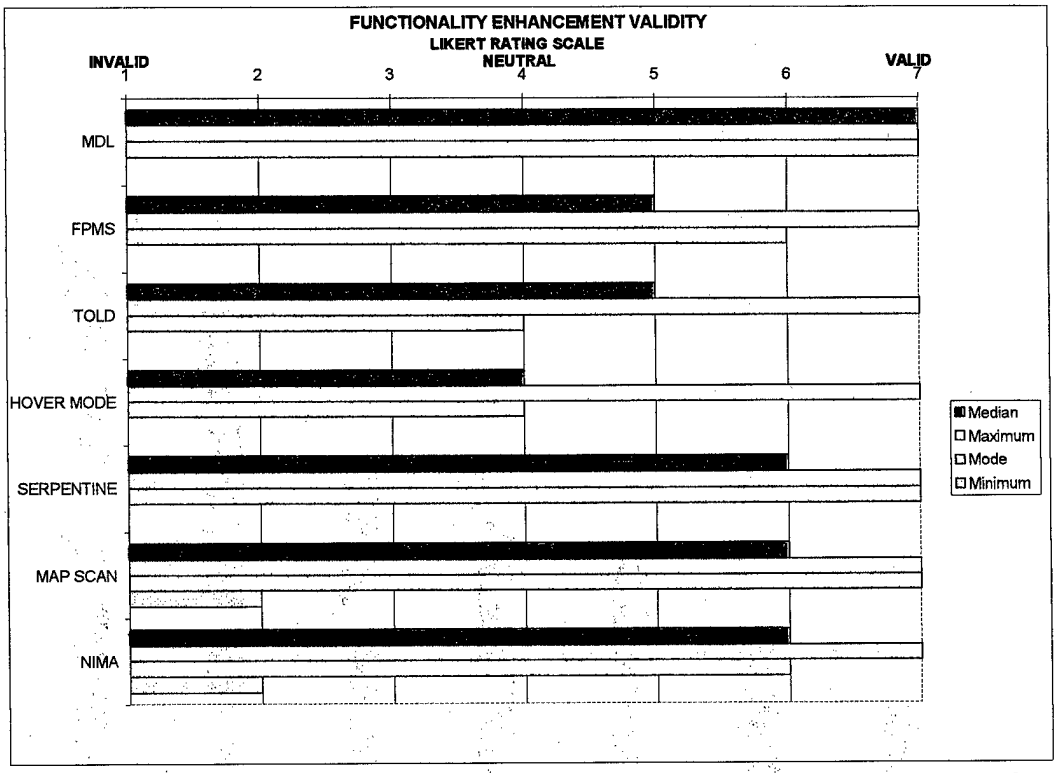


Figure 8.19. Functionality Enhancement Validity. Mode and Median ratings for all Functionality Enhancements was neutral to valid with the Takeoff and Landing Data (TOLD) and Hover Mode Tool receiving the lowest Mode ratings (4). The low rating of the Hover Mode Tool can be partially attributed to the KC-130 participation in the assessment – no need to hover there. Mission Data Loader (MDL) received the highest Mode and Median ratings (7). Maximum values reflect that one or more respondents found each enhancement valid while minimum values reflected that Map Scan and Access To Other Than NIMA Map Products were never rated invalid, unlike the other enhancements.

In Question 8, the second part of the General section, respondents were presented with a limited funding dilemma and asked to rank the mission planning system functionality enhancement listed below according to which they would like to buy for their community - first all the way to seventh, using the numbers one through seven only once. Below the list is Figure 8.20, the results from that ranking, arranged left to right, in order of what respondents would buy first to seventh. Mean (average) rankings for all functionality enhancements showed that, given a limited budget, respondents would buy an MDL for their aircraft first, the Serpenting Routing Tool second, Map Scanning Capability third, a Flight Performance Module for their aircraft fourth, access to other than NIMA Compressed Graphics fifth, a TOLD module sixth and a Hover Mode Tool seventh. The Modes for each enhancement conformed to this hierarchy except that FPM and Non-NIMA tied for fourth.

_____ Mission Data Load (MDL/Brick) capability

_____ Aircraft Specific Flight Performance Modules (FPMs)

_____ Takeoff and Landing Data (TOLD) weight and balance calculation capability

_____ Hover Mode Tool

_____ Circumlinear (serpentine) route drawing tool

_____ Capability to scan in any map and use it

_____ Capability to access other than strictly NIMA-produced compressed digital graphics

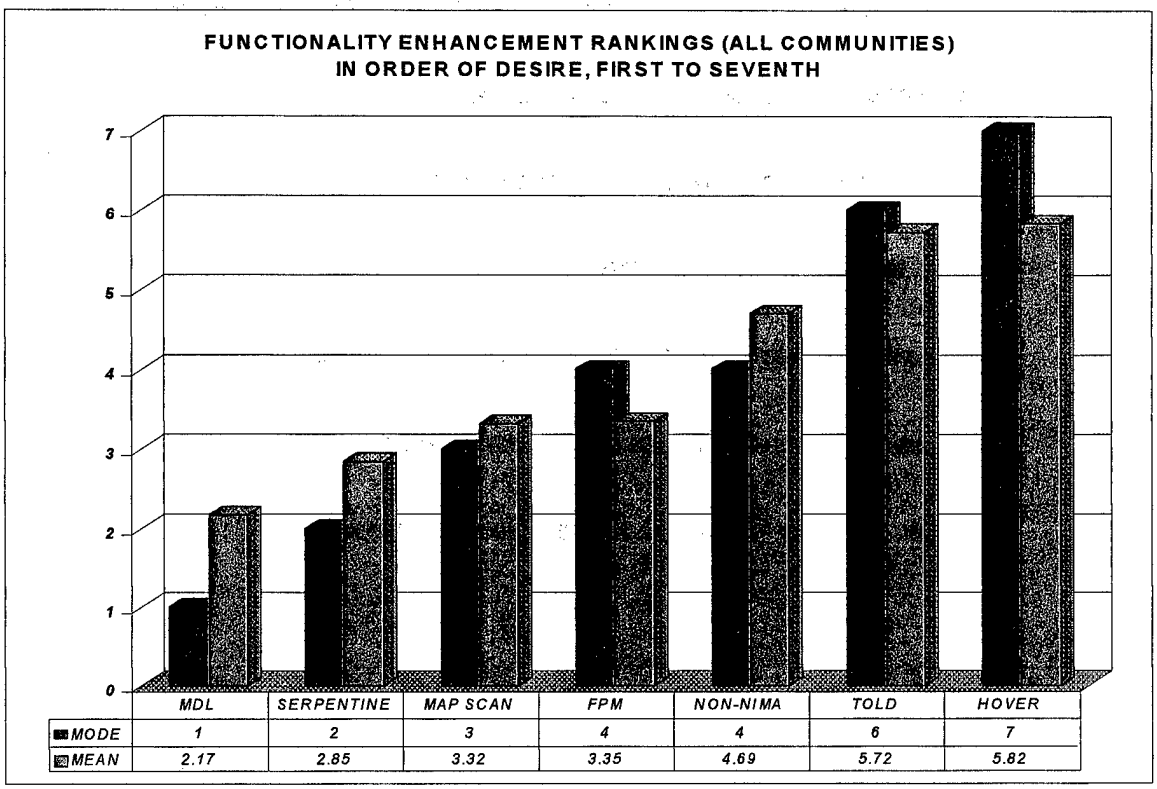


Figure 8.20. Functionality Enhancement Rankings. Mean (average) rankings for all Functionality enhancements showed that, given a limited budget, respondents would buy an MDL for their aircraft first, the Serpenting Routing Tool second, Map Scanning capability third, a Flight Performance Module for their aircraft fourth, access to other than NIMA compressed graphics fifth, a TOLD module sixth and a Hover Mode Tool seventh. The Modes for each enhancement conformed to this hierarchy except that FPM and Non-NIMA tied for fourth.

In Question 9 of the General section, respondents were given the opportunity to write down other functionality enhancements, not listed in Question 8, that they would like to see in future AMPS's. Their responses are listed below:

- "The ability to change route card setup."

- "3-D View of route."

- "Incorporate lite level planning, calculate shadows based on moon position."
- "Smartpackage creator menu."

- "The ability to change aircraft models."

In Question 10 and 11 of the General section, respondents were asked to rate the level of Tactical Impact and Time Savings respectively that PFPS would have on missions in their particular community. Below is the excerpt from the survey employed (Median scores boxed in

red ☐). Below the excerpt is Figure 8.21, the results from that rating. Respondents rated PFPS high on Tactical Impact as the Mode and Median ratings were significant to very significant. At least one respondent was neutral on the Tactical Impact of PFPS. Time Savings using PFPS was rated even higher with the Mode, Max and Median all showing Time Savings as very significant. At least one respondent felt the Time Savings was somewhat significant.

10) Using the scale below, rate the level of **Tactical Impact** using PFPS would provide have on missions in your community.

	VERY INSIGNIFICANT			**NEUTRAL**			**VERY SIGNIFICANT**
Tactical Impact.	1	2	3	4	5	[6]	7

11) Using the scale below, rate the level of **Time Savings** using PFPS would provide have on missions in your community.

Time Savings.	1	2	3	4	5	6	[7]

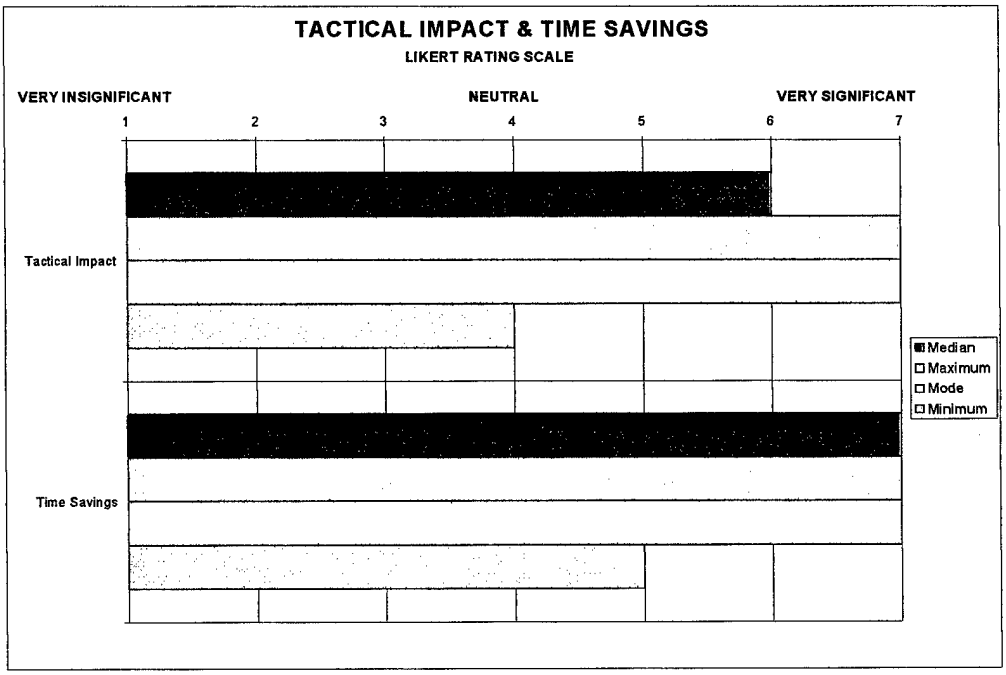


Figure 8.21. Tactical Impact and Time Savings. Respondents rated PFPS high on Tactical Impact as the Mode and Median ratings were significant to very significant. At least one respondent was neutral on the Tactical Impact of PFPS. Time Savings using PFPS was rated even higher with the Mode, Max and Median all showing Time Savings as very significant. At least one respondent felt the Time Savings was somewhat significant.

9.0 CONCLUSIONS The assessment results and conversations with the respondents highlighted the fact that the majority of the fleet still uses a 'stubby pencil' and CR2 slide rules or a combination of existing AMPSs in different work-around modes to complete simple mission planning tasks. In other words, no single AMPS has been developed which has been adopted by DoN aviators or which meets all their automated mission planning needs.

The conclusions provided below are based on the assessment results, augmenteds with the professional opinion and observations of the Project Action Officer. This section has been organized into Enhancing Characteristics and Deficiencies and subdivided into the applicable Critical Tactical Issues explored in the assessment.

9.1 Enhancing Characteristics

9.1.a Training. Training consisted of a 30 minute introduction to PFPS, a 50 minute hands-on presentation (computer lab) and on-the-job training via billet requirements or in a self-paced environment. In light of the relatively steady average usage of PFPS during the course (Figure 8.2), and the adequacy ratings for the training (Figure 8.10), training with PFPS was simple enough for almost two thirds of the respondents to say they felt comfortable instructing PFPS to their squadron after only an average of 6.1 hours of training time (Figure 8.11). The majority of computer/operating system experience of the respondents being PC/Windows-based (Figures 8.4 and 8.5) is 'fleet representative' and no doubt aided in the rapid assimilation of PFPS.

9.1.b Human Factors. The Human Factors section covered all basic hardware/software interfaces of PFPS. All aspects of the PFPS human-machine interface appeared 'very easy' to 'extremely easy' to use. Again, the PC/Windows/Windows 95 background of a majority of the respondents was believed to be a strong influence here.

9.1.c Documentation. None noted.

9.1.d Compatibility. The Compatibility section covered the compatibility of PFPS with the operating system, within its own modules and with the mission planning needs of the users. PFPS was found to be 'compatible' to 'very compatible' with hardware/software and user needs (Figure 8.14).

9.1.e Reliability. The Reliability section covered the reliability of the Route Server and sub-modules of PFPS as well as the reliability of PFPS running on Windows 95. Crashes per session for both PFPS and Windows 95 were recorded as well as post-crash results for PFPS. PFPS was very reliable, having relatively few crashes and those crashes rarely resulting in the end of a session (reboot of PFPS required) (Figures 8.15, 8.16, 8.17).

9.1.f Maintainability. The Maintainability section covered the user's opinion of whether or not they would be able to install PFPS and set up the required databases, troubleshoot PFPS software malfunctions, access technical support and whether or not PFPS requires a Weapons and Tactics Instructor to train unit personnel in its use. PFPS is easy to maintain due to ease of installation, ease of accessing technical support and that a WTI or 'specialist' is not required to train others in its use (Figure 8.18).

9.1.g Tactical Impact/Time Savings. In the Tactical Impact and Time Savings subsections, respondents were asked to simply rate the significance of the tactical impact and time savings PFPS would have on a mission in their particular community. PFPS would have a very significant tactical impact simply because of time savings in making changes in an environment where change is constant (Figure 8.18). Time savings and tactical impact will be further boosted with the advent of the hardware to support Mission Data Loaders.

9.2 Deficiencies

9.2.a Training. The absence of an 'on-line' tutorial that would provide the user 'How to.....', necessitated the formal and laboratory training given prior to the assessment. A tutorial, such as a 'Coach' or help menu selection consistent with user background (PC/Windows-based) may eventually eliminate the need for this.

9.2.b Human Factors. Question 9 of the Human Factors section asked the respondents about the level of difficulty experienced while editing an overlay file (change route, update threat, change aircraft configuration). Changing aircraft configuration was the sole reason for the lower median rating in this question while attempting wholesale changes in the system administration limits and aircraft configuration files. This process requires improvement to make it more simple and make it more intuitive for the user.

9.2.c Documentation. Respondents were at best neutral about the adequacy of the online help because it is limited. Documentation could be improved to offer more help menu selections of the most common tasks users experience difficulty with.

9.2.d Compatibility. None noted.

9.2.e Reliability. None noted.

9.2.f Maintainability. Related to the Training and Documentation deficiencies noted above was the lack of tutorials or instructions to assist users installing PFPS and troubleshooting problems with the modules. This problem has partially been corrected with the publishing of the hard copy Installation Guide, however, an 'Install Wizard' and online troubleshooting consistent with user computer experience would be more practical.

9.2.g Tactical Impact/Time Savings. None noted.

9.2.h Other. Currently, aircraft-specific overlays for a particular mission (i.e., routes, threats, drawings) must be saved in separate files and opened separately. The capability should exist to create a mission folder that would contain all aircraft routes for a mission as well as threats and mission–specific drawings (phaselines, etc.).

10.0 RECOMMENDATIONS The recommendations provided below are based on the assessment results and the conclusions in the previous section and they are augmented with the professional opinion and observations of the Project Action Officer. This section has been organized into a **General** section, providing 'big picture' recommendations and a **Specific** section, recommending more detailed actions.

10.1 General During the assessment, PFPS was very well received as an extremely valuable planning tool and it was quickly assimilated by the respondents. For basic mission planning functionality as well as for preparing reuseable briefing products (electronic and hard copies), its speed and ease of use was unmatched by any single AMPS. Accordingly, the following general recommendations to CNO N62, CNO N880 and PMA-233 are provided:

10.1.a Provide rapid dissemination of the most current version of PFPS to all DoN squadrons as soon as possible.

10.1.b Plan and provide for rapid implementation of the top three (or more) functionality enhancements (resources permitting) identified in this report.

10.1.c Augment existing fleet AMPS computer hardware with limited laptop and desktop computer buys – this must include Mission Data Loader Receptacle (MDLR) procurement.

10.1.d Fund rapid correction of all deficiencies with PFPS noted in this assessment report.

10.1.e Cosidering the computer experience of the assessment respondents and the fleet and considering the results of this assessment, recommend any follow-on AMPS procured (JMPS/TAMPS 7.0) conform with IT-21 standards and be modeled after PFPS. PC-based, Windows 95/NT compatible, point-and-click, drag-and-drop, etc. are some of the qualities that future AMPS's should possess.

10.2 Specific

10.2.a In light of the assessment respondent's computer training history (home PC and DOD OJT) and software developers and academic institutions moving toward Computer Based Training (CBT), recommend steering improvements in PFPS Training toward an 'on-demand' online tutorial. This capability should include an 'Install Wizard', introductory training session that provides live results and a 'Coach' function available at any time for most of the more common tasks.

10.2.b Until the capability above is available, recommend introductory training (similar to what was done for this assessment) be provided that will enable fleet acceptance of PFPS and aid in the preparation for introduction of TAMPS 7.X.

10.2.c Fund the fielding of a hard copy user's guide to augment the online help and satisfy the needs of users who are not familiar with using online help.

10.2.d Fund PFPS Mission Data Loader Receptacle (MDLR) hardware and software upgrades for all DON squadrons.

10.2.e Fund PFPS Serpentine (Circumlinear) route drawing tool capability.

10.2.f Fund PFPS Map Scan capability. This capability should include the ability to scan in any map (overhead imagery, etc.) and georectify it by identifying (giving lat-long, grid, etc.) at least 3 known points (triangulation).

10.2.g Fund Hover Mode Tool capability. Although DoN Tactical Aviation and C-130s would have no use for this tool, the high percentage of Marine Corps rotary wing (and eventual tilt rotor) aircraft makes this tool a must. All DoN rotary wing aircraft will benefit from this enhancement.

10.2.h Fund the remaining Flight Performance Modules for all aircraft in the Naval Aviation Inventory and any aircraft currently under development (i.e., V-22).

10.2.i Fund the capability to create a single mission folder to hold multiple route, threat and drawing overlays. This capability must include the ability to 'clutter' and 'declutter' the display as required for a mission briefing/smartpack.

DISTRIBUTION LIST

Activity	No. Copies
Defense Technical Information Center 8725 John Kingman Rd, STE 0944 Ft. Belvoir, VA 22060-6218	2
Commanding General MCCDC C-45 3300 Russel Rd Quantico, VA 22134-5001	1
Chief of Naval Operations N880G9 Attn: CDR J. Adan USN 2000 Navy Pentagon Washington, DC 20350-2000	1
Chief of Naval Operations N62 Attn: LCDR R. C. Rivera USN C&C Systems Division Presidential Towers, 5th Floor 2511 Jefferson Davis HWY Arlington, VA 22243	1
NAVAIRSYSCOM PMA-233 Attn: CAPT T. Spillman USN 47123 Buse Rd, Unit IPT Patuxent River, MD 20670-1547	1
NAVAIRSYSCOM PMA-233 Attn: CAPT M. Swaney USN 47123 Buse Rd, Unit IPT Patuxent River, MD 20670-1547	1
NAVAIRSYSCOM PMA-233, PEO (T) Attn: Maj Steve Bennett USMC Bldg 2272, Suite 537 47123 Buse Rd, Unit IPT Patuxent River, MD 20670-1547	5

Headquarters US Marine Corps.....1
Aviation Dept, APW-1
Attn: Col Nasby
1155 Defense Pentagon, Rm 5D 773
Washington, DC 20301-1155

Headquarters US Marine Corps.....1
Aviation Dept, APW-91
Attn: MAJ J. Kazin USMC
1155 Defense Pentagon
Washington, DC 20380-1775

Headquarters US Marine Corps.....1
Aviation Dept, APW-71
Attn: MAJ J. Braden USMC
1155 Defense Pentagon
Washington, DC 20301-1155

Marine Corps Warfighting Lab.....1
Attn: Col A. Woods USMC
P.O. Box 308
Quantico, VA 22134

Marine Corps Warfighting Lab.....1
Attn: LtCol McMains USMC
P.O. Box 308
Quantico, VA 22134

HMX-1.....1
Operational Test and Evaluation
Attn: MAJ W. Conley USMC
2102 Rowell Road
Quantico, VA 22134

Commanding Officer.....1
VX-9
China Lake, CA 93555

Naval Doctrine Command.....1
Attn: CDR S. Walsh USN
8952 First St, Suite 200
Norfolk, VA 23511-3790

COMOPTEVFOR.....1
Attn: LT P. Costello USN
7970 Diven St.
Norfolk, VA 23505-1498

Aviation Safety Programs.....1
Code 034
Attn: Dr. Ciavarelli
Naval Postgraduate School
1588 Cunningham Rd, Room 301
Monterey, CA 93943-5202

Director Studies and Analysis Division.....1
MCCDC C-453
3033 Russell Rd
Quantico, VA 22134-5130

Commanding Officer.....1
46th Test Squadron
Attn: LTC J. Thorne USAF
205 West D Ave, Suite 628
Eglin AFB, FL 32524-6865

Commander.....1
Naval Strike and Air Warfare Center
Code N515
Attn: Capt Mayberry USMC
NAS Fallon, NV 89496-5000

APPENDIX A. PFPS BROCHURE

PFPS

PC Flight Planning System

The World Standard PC Based Mission Planning

46th

QUADRON

For The US Air Force And The World

PFPS provides total squadron level mission planning from preflight to mission debrief.

PFPS lets you plan the entire mission on one system: any mission, any aircraft, anywhere.

Types of missions supported include:

- Air Interdiction
- Air Drop
- Counter Air
- Electronic Combat
- Refueling
- Close Air Support

Types of aircraft supported include:

- Fighter
- Bomber
- Airlift
- Tanker
- Helicopters
- UAV

World-wide mission planning coverage:

- World-Wide Digital Mapping
- Imagery and Photography
- Navigational Aids

Completed mission plans tailored to specific mission requirements.

Plans may be output as:

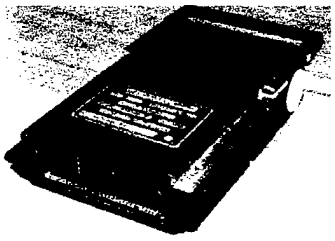
- Knee-Board style Form 70 Cards

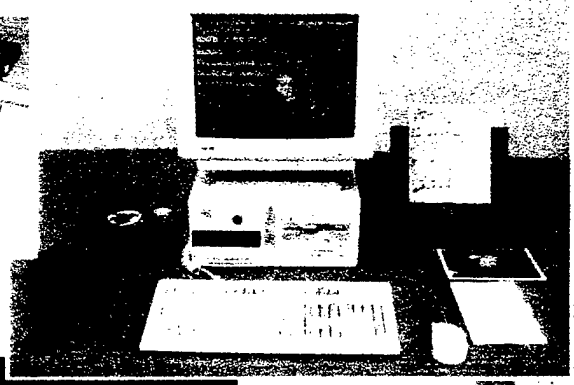
PFPS *The World's Premier PC Based Mission Planning System*

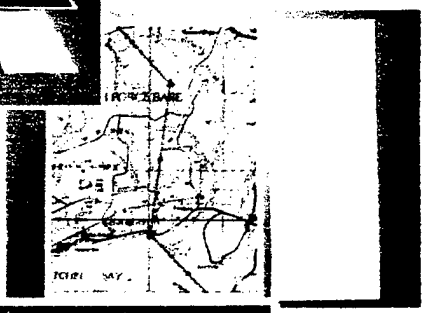
The World's Most Complete PC Based Mission Planning System

PFPS provides an integrated environment supporting all missions and aircraft. Mission Planning tools include: flight, route and airdrop planning (tabular and digital mapping views); weapons delivery and target area tactics, as well as cartridge load. The primary outputs of PFPS include: User-Customized Knee-board Cards, Combat Mission Folders, and Data Transfer Services. The DTD is used to upload and download mission information to aircraft on-board computers and weapon systems.

All mission planning tools are integrated under a common, consistent Microsoft Windows™ graphical user-interface and can be installed on inexpensive, commercially available desktop and portable computer systems.

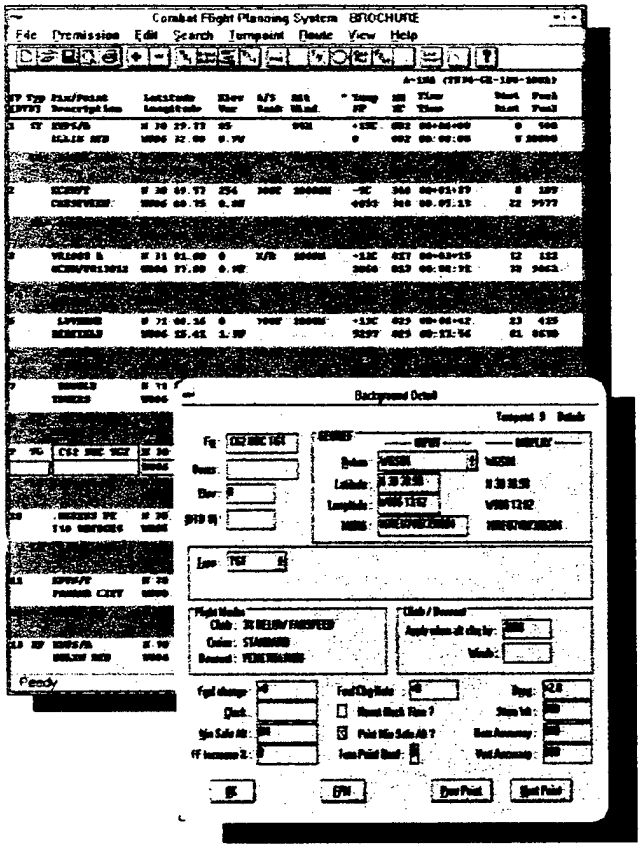






PFPS The World Standard

Full Suite Of Seamlessly Integrated Air-To-Air & Air-To Ground Planning Tools

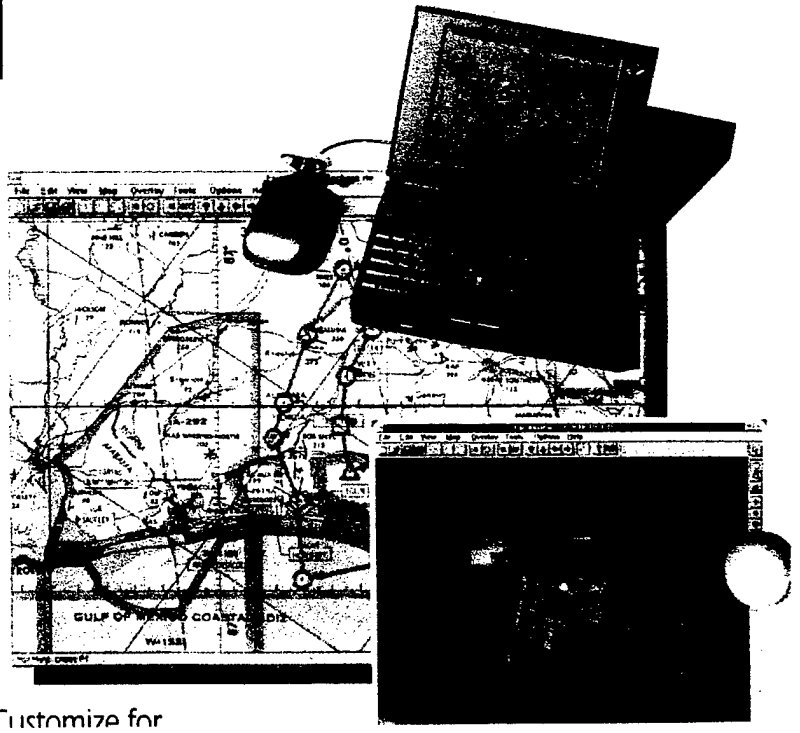


CFPS - Combat Flight Planning Software

- Easy editing with "Form 70"-style Tabular view
- Fully supports Search and Retrieval from a standard DAFIF based library of Navaids (VOR, TACAN), Waypoints (IFR and Low Level) and User-Defined Points
- Inflight Planning from Departure to Landing with Customized Knee-Board style Cards
- Complete Takeoff and Landing Data Card Preparation
- Fully Supported with DoD Certified, Technical Order Based, Flight Performance Data
- Interoperable with other mission planning systems via data file exchange

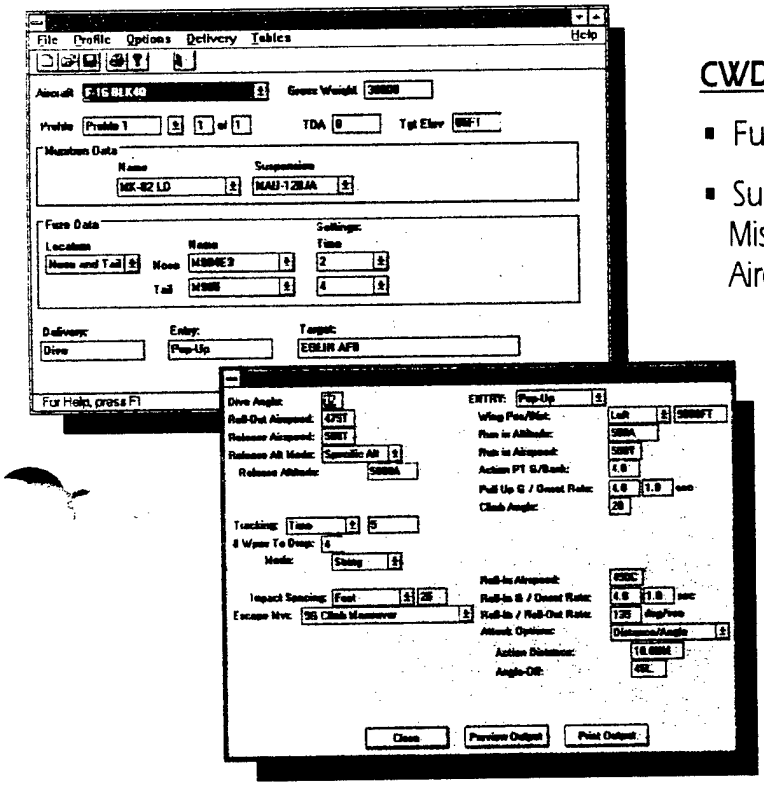
FalconView - Digital Mapping Software

- Fully Integrated with CFPS
- "Point and Click" Route Editing
- DMA Standard World-Wide Maps, DTED, and Photo-Imagery
- Moving Map with GPS for Inflight Positioning Capability
- Complete Full-Color Capability to Produce Combat Mission Folders
- Threat Analysis Includes Visual Overlays for Engagement Capabilities
- Easy-To-Use Map Data Manager to Update and Customize for



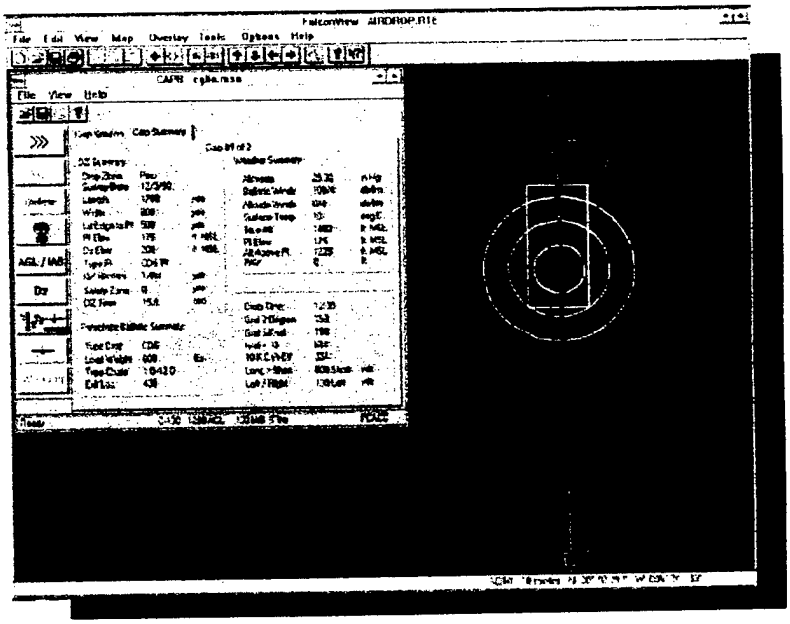
Based Mission Planning Systems

Easy-To-Learn, Easy-To-Use with a Standard Microsoft™ Windows Interface



CWDS - Combat Weapon Delivery Software

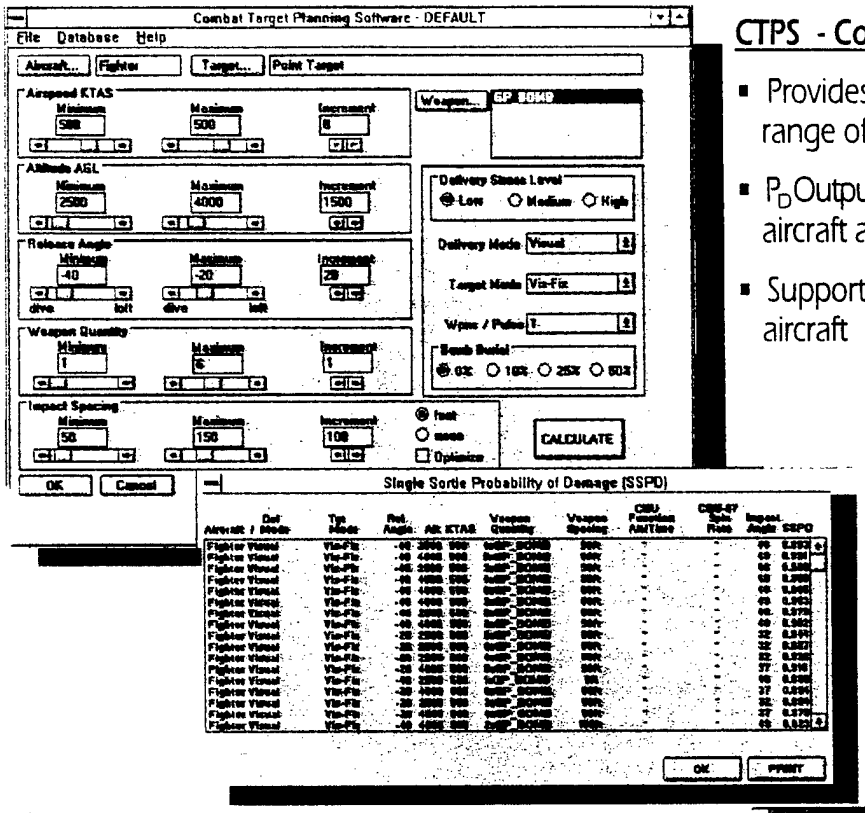
- Fully Integrated with CFPS and FalconView
- Supports the Full Range of Weapon Delivery Mission Planning needs for all Fighter and Bomber Aircraft
  - Supports a wide range of munitions – General Purpose Bombs through CBUs, including CEM, Sensor Fuzed Weapon, and most Laser Guided Bombs.
  - Incorporates USAF certified Safe Escape and Safe Separation methodology
  - Provides USAF standard Ballistic and Safe Escape tabular data



CAPS-Combat AirDrop Planning Software

- Fully Integrated with CFPS and FalconView
- Complete Computed Air Release Point (CARP) and High Altitude Release Point (HARP) Solutions
- Certified Drop Zone (DZ) Database
- DZ Imagery
- Automated DZ Survey Support
- Supported Airframes: C-130, C-141, C-17, C-5
- Supports all USAF Airdrop communities: AMC, ACC, AFSOC, and ANG

Uses Inexpensive, Widely Available PC Desktop and Notebook Computers

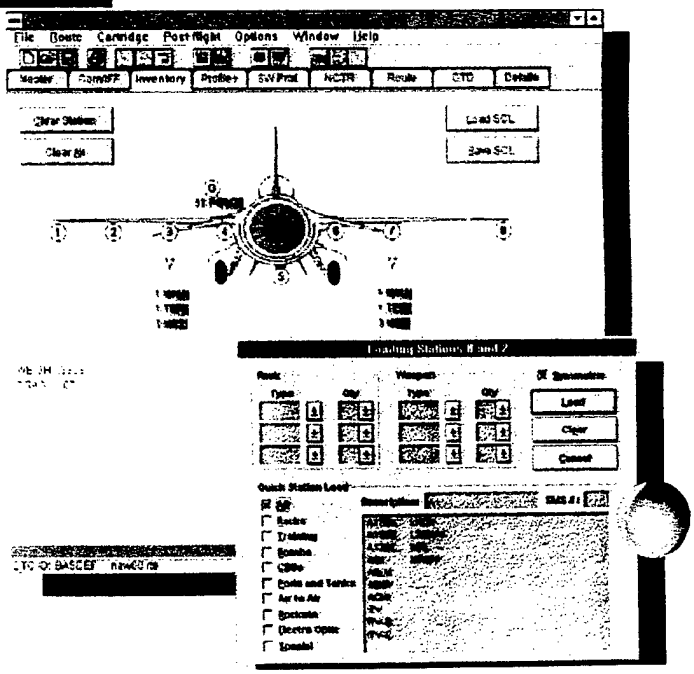


CTPS - Combat Target Planning Software

- Provides JMEM Probability of Damage (P_D) for a range of delivery parameters
- P_D Outputs prioritized highest to lowest for selected aircraft and munition against a JMEM target
- Supports a wide range of munitions and fighter aircraft

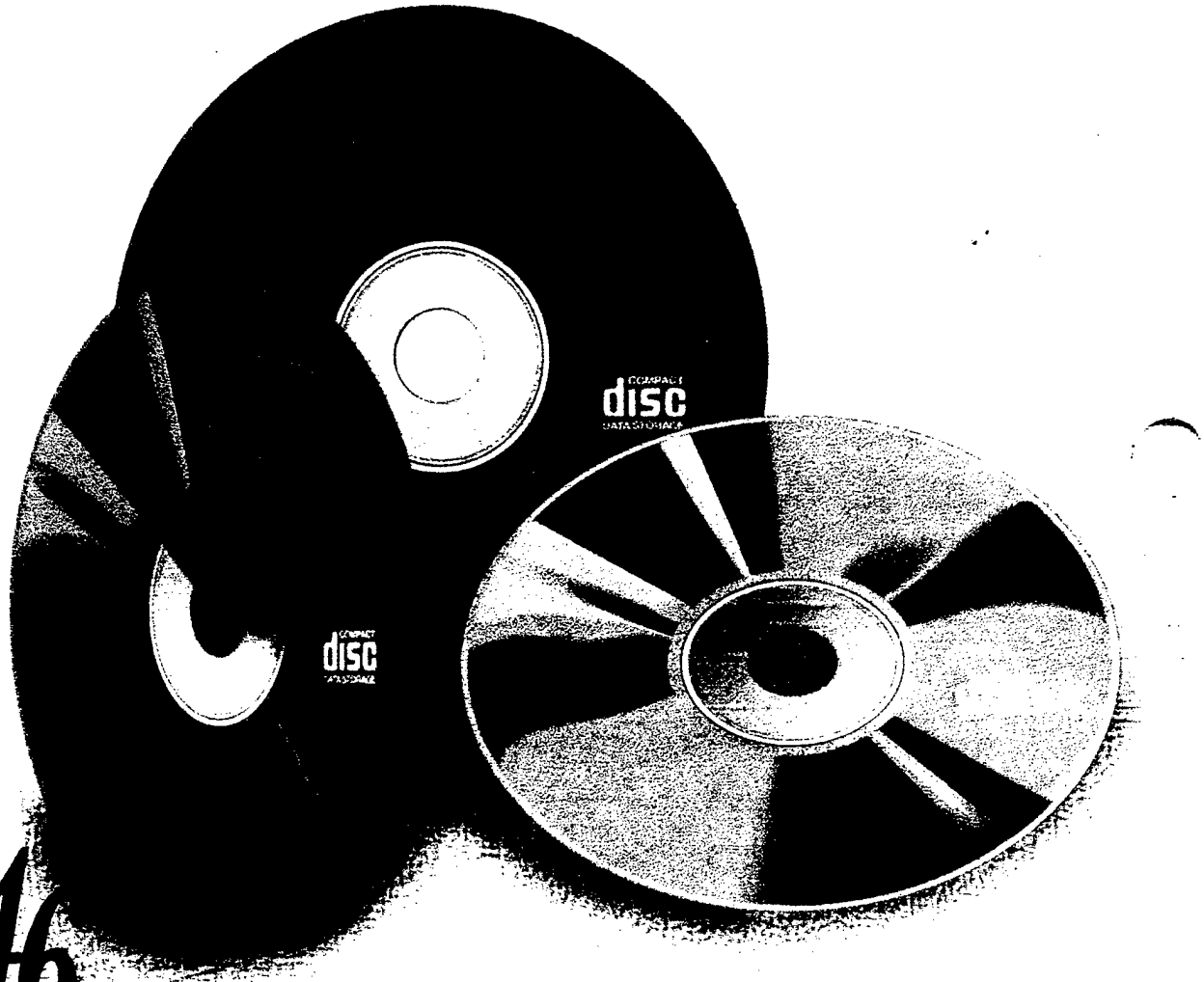
Cartridge Load

- Fully Integrated with CFPS
- Supports the Full Range of Cartridge Needs: Route, Communication, Navigation, Weapons, etc.
- Currently Supported Airframes: F-16s, B-52, B-1, F-117 Interface
- Future Support: C-130 Family, HH-60
- Supports Standard Mission Download for Debriefing



Order PFPS Today!

Ask Your Technical Order Distribution Officer



46th TEST SQUADRON

46 TS/OGET
205 W D Ave. Suite 628
Eglin AFB, FL 32542-6865
Voice: (904) 882-3527, DSN 872-3527
FAX: (904) 882-6379, DSN 872-6379

Acknowledgements
Windows™ is a trademark of Microsoft Corporation
Pentium™ is a trademark of Intel Corporation

Place your order at the SSF Today:

Call the System Support Facility (SSF) for PFPS

1-800-SSF-SSFX

Recommended Hardware:

Pentium™-class PC
16MB of RAM, 1GB Hard Disk
4X CD-ROM Drive
17" monitor (desktop) or 800 x 600 capable notebook/laptop

APPENDIX B. INITIAL SURVEY

PORTABLE FLIGHT PLANNING SOFTWARE (PFPS)
INITIAL QUESTIONNAIRE

Instructions. This questionnaire is designed to collect information on your computer experience and mission planning experience up to this point. In later surveys you will be given an opportunity to give your opinion about mission planning system needs for your specific community. **Your participation in the follow-on surveys is critical to getting the best mission planning system out to the fleet. Please participate!**

Background Information.

Name: _____ Rank (i.e., O-3): _____ Service (i.e., USMC): _____
Age: _____

MOS Description (circle or write in one): CH-46E CH-53D/E/J AH-1W UH-1N KC-130
F/A-18 AV-8

EA-6B Intelligence GCE Other: _____

Years of Service: _____ Years of Operational Flying: _____ Total Military Flight hours: _____

Computer Experience (circle or write in one or more):

PC MAC Network Mainframe None Other: _____

If other than **None** above, what is your operating system experience (circle or write in one or more):

DOS MAC OS2 Unix Win95/97/NT None Other: _____

If other than **None** above, what is your program interface (i.e., Graphcal User Inerface) experience:

Win 3.1 MAC OS2 Unix Win95/97/NT None Other: _____

What is the highest level computer capability available in your unit available for (or dedicated to) mission planning? (Circle or write in one)

386 486 586 (Pentium) None Other: _____

If you have computer experience, what do you attribute most of your computer experience to? (Circle or write in one)

DOD On the Job Training Home Computing Formal DOD Computer Training

College Degree Requirement Civilian Job Training Other: _____

Mission Planning System Experience (circle or write in one or more):

PFPS TAMPS TOPSCENE FalconView FPLAN CHAMPS FOREM None Other: _____

If other than **None** above, was your experience with Mission Planning Systems under: **Training Exercise Operation** conditions (circle one or more).

Approximate hours of previous 'hands-on' experience using PFPS: _____

APPENDIX C. FOLLOW-ON SURVEY

PORTABLE FLIGHT PLANNING SOFTWARE (PFPS) BASELINE QUESTIONNAIRE

Instructions. This questionnaire is designed to collect information on your experiences using PFPS. This is also an opportunity for you to give your opinion about mission planning system needs for your specific community. The survey consists of a background information section followed by seven sections of questions on: **(1) Training, (2) Human Factors, (3) Documentation, (4) Compatibility, (5) Reliability, (6) Maintainability, and (7) General**. Comments can be made after each question. If you have not already completed the Initial Questionnaire, asking you for background information, please ask your division PFPS Model Manager to get you one.

Your participation in this and subsequent survey periods is critical to getting the best mission planning system out to the fleet. Please continue participating!

Background Information.

Name: _____ Rank (i.e., O-3): _____ Service (i.e., USMC): _____

I have completed the Initial Survey asking me all pertinent background information (circle one). Yes No

---

I. TRAINING

Using the scale below, rate your opinion of the level of **adequacy** experienced during each PFPS training evolution by circling a corresponding number. Comments may be made after each question.

	EXTREMELY INADEQUATE			NEUTRAL			EXTREMELY ADEQUATE
1) The 30 minute Introduction to PFPS.	1	2	3	4	5	6	7
Comments/What could be better?: _____							
2) The 50 minute 'Hands-On' Presentation.	1	2	3	4	5	6	7
Comments/What could be better?: _____							
3) On-the-Job (OJT) training time availability.	1	2	3	4	5	6	7
Comments/What could be better?: _____							

4) With your training in PFPS *up to this point*, would you be comfortable instructing your squadron on PFPS use? (Circle one) Yes No

5) Approximately **how** many hours of 'hands-on' PFPS experience have you had ***since last survey***? _____

II. HUMAN FACTORS

Using the scale below, rate your opinion of the level of **difficulty** experienced while using the following human-machine interfaces in PFPS by cirdling a corresponding number. Comments may be made after each question.

	EXTREMELY HARD			NEUTRAL			EXTREMELY EASY
1) Working with available PC/Laptop hardware (e.g., mouse, keyboard, touchpad).	1	2	3	4	5	6	7
Comments/What could be better?: _____							

	EXTREMELY HARD			NEUTRAL			EXTREMELY EASY
2) Working with available printer hardware	1	2	3	4	5	6	7
Comments/What could be better?: _____							
3) Working with the PFPS Graphical User interface (GUI) (i.e., Desktop, icons toolbars, windows, etc.),	1	2	3	4	5	6	7
Comments/What could be better?: _____							
4) PFPS 'boot-up' sequence.	1	2	3	4	5	6	7
Comments/What could be better?: _____							
5) Opening a CFPS window.	1	2	3	4	5	6	7
Comments/What could be better?: _____							
6) Opening a FalconView window.	1	2	3	4	5	6	7
Comments/What could be better?: _____							
7) Opening a saved Overlay File (e.g., route, threat, waypoint, etc.).	1	2	3	4	5	6	7
Comments/What could be better?: _____							
8) Saving an overlay file.	1	2	3	4	5	6	7
Comments/What could be better?: _____							
9) Editing an overlay file (e.g., change route, update threat, change aircraft configuration).	1	2	3	4	5	6	7
Comments/What could be better?: _____							
10) Printing PFPS products.	1	2	3	4	5	6	7
Comments/What could be better?: _____							

III. DOCUMENTATION

Using the scale below, rate your opinion of the level of **adequacy** experienced while referring to the following documentation sources in PFPS by circling a corresponding number. Comments may be made after each question.

	EXTREMELY INADEQUATE			NEUTRAL			EXTREMELY ADEQUATE
1) Hard copy PFPS user's guide.	1	2	3	4	5	6	7
Comments/What could be better?: _____							
2) PFPS online 'help'.	1	2	3	4	5	6	7
Comments/What could be better?: _____							
3) Descriptions/Instructions accompanying a pull-down/pop-up menu item once it is selected (e.g., description box for map scale choices, etc.).	1	2	3	4	5	6	7
Comments/What could be better?: _____							

IV. COMPATIBILITY.

Using the scale below, rate your opinion of the level of **compatibility** experienced between PFPS and the stated software/mission planning requirement by circling a corresponding number. Comments may be made after each question.

	EXTREMELY INCOMPATIBLE			**NEUTRAL**			**EXTREMELY COMPATIBLE**
1) PFPS with the Windows 95 operating system.	1	2	3	4	5	6	7
Comments/What could be better?: _____							
2) CFPS module with FalconView module.	1	2	3	4	5	6	7
Comments/What could be better?: _____							
3) PFPS print options with available printer.	1	2	3	4	5	6	7
Comments/What could be better?: _____							
4) PFPS printed products (i.e., route cards, maps) with briefing/smartpack requirements.	1	2	3	4	5	6	7
Comments/What could be better?: _____							
5) PFPS *Threat* Menu selections with mission planning requirements.	1	2	3	4	5	6	7
Comments/What could be better?: _____							
6) PFPS *Aircraft Weight & Performance* Menu selections with mission planning requirements.	1	2	3	4	5	6	7
Comments/What could be better?: _____							
7) PFPS *Route Construction* menu selections with mission planning requirements.	1	2	3	4	5	6	7
Comments/What could be better?: _____							
8) PFPS *Airspace Overlay* menu selections with mission planning requirements.	1	2	3	4	5	6	7
Comments/What could be better?: _____							

V. RELIABILITY

Using the scale below, rate your opinion of the level of **reliability** experienced while using PFPS for mission planning by circling a corresponding number. Comments may be made after each question.

	EXTREMELY UNRELIABLE			**NEUTRAL**			**EXTREMELY RELIABLE**
1) The CFPS module.	1	2	3	4	5	6	7
Comments/What could be better?: _____							
2) The FalconView module.	1	2	3	4	5	6	7
Comments/What could be better?: _____							
3) The Route Server.	1	2	3	4	5	6	7
Comments/What could be better?: _____							

	EXTREMELY UNRELIABLE			NEUTRAL			EXTREMELY RELIABLE
4) PFPS running on Windows 95.	1	2	3	4	5	6	7

Comments/What could be better?: _____

5) While using PFPS, approximately how many times *per session* did PFPS or one of its modules crash? (stop working)

_____

Comments: _____

6) Did these crashes end your session or were you able to restart PFPS or the failed module(s) and continue? (Circle one)

Yes, session ended No, session continued Mixed No Crashes

Comments: _____

7) While you were using PFPS, approximately how many times *per session* did Windows 95 crash? (stop working)

_____

Comments: _____

VI. MAINTAINABILITY

Using the selections available for each question, provide your answer. Comments may be made after each question.

1) If the minimum required computer (100 megahertz, Pentium PC, running Windows 95) was available to your unit, would you be comfortable installing/reinstalling PFPS and setting up the required databases and modules for your unit's use? (Circle one)

Yes No Don't Know

Comments: _____

2) With your training in PFPS up to this point, do you feel comfortable troubleshooting PFPS software malfunctions? (Circle one)

Yes No Don't Know

Comments: _____

3) With your training in PFPS up to this point, could you locate information on how to access technical support? (Circle one)

Yes No

Comments: _____

4) With your training in PFPS up to this point, do you think PFPS requires a WTI to train other unit personnel in its use? (Circle one)

Yes No Don't Know

Comments: _____

VI. GENERAL

Using the scale below, rate the validity of each proposed mission planning system functionality enhancement as is concerns your community. Comments on your rating may be made after each item.

	INVALID			NEUTRAL			VALID
1) Mission Data Load (MDL/Brick) capability.	1	2	3	4	5	6	7

Why did you rate it this way?: _____

	INVALID			NEUTRAL			VALID
2) Aircraft Specific Flight Performance Modules. (FPMs)	1	2	3	4	5	6	7
Why did you rate it this way?:_____							
3) Takeoff and Landing Data (TOLD) weight and balance calculation capability.	1	2	3	4	5	6	7
Why did you rate it this way?:_____							
4) Hover Mode Tool.	1	2	3	4	5	6	7
Why did you rate it this way?:_____							
5) Circumlinear (serpentine) route drawing tool.	1	2	3	4	5	6	7
Why did you rate it this way?:_____							
6) Capability to scan in any map and use it.	1	2	3	4	5	6	7
Why did you rate it this way?:_____							
7) Capability to access other than strictly NIMA-produced Compressed Arc Digital Raster Graphics(CADRG) files.	1	2	3	4	5	6	7
Why did you rate it this way?:_____							

8) You are given a limited amount of funding and asked to rank the mission planning system functionality enhancement listed below according to which you would like to buy first all the way to seventh. Please rank the following according to your specific communities needs, using the numbers one through seven only once.

_____ Mission Data Load (MDL/Brick) capability

_____ Aircraft Specific Flight Performance Modules (FPMs)

_____ Takeoff and Landing Data (TOLD) weight and balance calculation capability

_____ Hover Mode Tool

_____ Circumlinear (serpentine) route drawing tool

_____ Capability to scan in any map and use it

_____ Capability to access other than strictly NIMA-produced compressed digital graphics

9) Are there any other enhancements you would like to see? Please do not include them in the above ranking.

_____

_____

10) Using the scale below, rate the level of **Tactical Impact** using PFPS would provide have on missions in your community.

	VERY INSIGNIFICANT			NEUTRAL			VERY SIGNIFICANT
Tactical Impact.	1	2	3	4	5	6	7
Why?:_____							

11) Using the scale below, rate the level of **Time Savings** using PFPS would provide have on missions in your community.

	VERY INSIGNIFICANT			**NEUTRAL**			**VERY SIGNIFICANT**
Time Savings.	1	2	3	4	5	6	7

Time savings in what areas?:_____

Thank You For Your Time

APPENDIX D. OPERATIONAL RISK MANAGEMENT PLAN

D.1 Operational Risk Management (ORM). Two areas have been identified to present potential hazard to personnel and equipment during this assessment. Each is detailed in following sections, along with pertinent risk decisions, controls to be implemented, and supervisory roles designated. Specific potential hazards include:

- WTI control points in the PFPS waypoint database possibly entered incorrectly.
- Weight and performance data in the baseline aircraft routes possibly entered incorrectly.

D.1.a Hazard: WTI control points in the PFPS waypoint database possibly entered incorrectly.

Assessment: With the introduction of products from AMPSs into the cockpit, there is an inherent risk that the information may be incorrect in the databases available for user selection.

Risk Decision(s): This hazard, given that the controls and supervision is completed, is determined to be 'low risk'.

Control(s) Implemented: The WTI Control Point database will be screened for accuracy in labeling and position.

Supervisory Role(s): The Project Action Officer will ensure that each point in the WTI Control Point database is screened for accuracy in labeling and position prior to its use in mission planning.

D.1.b Hazard: Weight and performance data in the baseline aircraft routes possibly entered incorrectly.

Assessment: With the introduction of products from AMPSs into the cockpit, there is an inherent risk that the information may be incorrect in the databases available for user selection.

Risk Decision(s): This hazard, given that the controls and supervision is completed, is determined to be 'low risk'.

Control(s) Implemented: The individual aircraft weight and performance data in the baseline aircraft routes will be screened for accuracy in all areas.

Supervisory Role(s): The division PFPS Model Manager will build and check their specific aircraft weight and performance data in the baseline aircraft routes for accuracy in all areas prior to its use for mission planning.

APPENDIX E. ASSESSMENT REPORTS/DELIVERABLES PLAN

ASSESSMENT REPORTS/DELIVERABLES PLAN

Qualitative Assessment Title:	PORTABLE FLIGHT PLANNING SOFTWARE (PFPS)
Applicable Requirements Documents (Mission Needs Statement, TEMP, ORD, etc.):	TAMPS OAG AFTER-ACTION MESSAGE NAVSTKAIRWARCEN 161540Z MAY 97
Sponsor/Tasking Agency Representative (Rank, Name, E-mail, Phone, FAX):	PMA-233, MAJ STEVE BENNETT USMC DSN 664-3426 x7903, (703) 604-3426 bennettjs.ntprs@navair.navy.mil
Project Action Officer (Rank, Name, E-mail, Phone, FAX):	CAPT ROB BARR USMC, DSN 951-3469, (520) 341-3469 barrr@pendleton.usmc.mil

TAILORED REQUIREMENTS LIST:

DELIVERABLE	DUE DATE	CONFIGURATION or FORMAT	REMARKS*
PFPS TRAINING	16 JUL 97	LIVE TUTORIAL	COMPLETE, LITTON PRC
PFPS VER 3.0	01 SEP 97	COMPACT DISC	**FROM PMA-233** TO MAWTS-1.
TWO (2) 200 MHZ COMPUTERS	01 SEP 97	CPU, MONITOR, MOUSE, KEYBOARD, REQUIRED CABLES, WIN 95/NT INSTALLED	**FROM PMA-233** TO MAWTS-1.
PFPS VER X.X	WHEN AVAILABLE	COMPACT DISC	**FROM PMA-233** TO MAWTS-1.
CONTINUED EVAL	INDEFINITE	NA	**FROM MAWTS-1** TO PMA-233
FINAL REPORT	05 JAN 98	ELECTRONIC/ HARDCOPY	**FROM MAWTS-1** TO PMA-233

***Include who the deliverable will come from and who the deliverable will go to.**

DATE APPROVED: 12 September 1997

FOR MAWTS-1: Robert S. Barr

FOR SPONSOR/TASKING AGENCY: PMA-233

COLOPHON

This report was word processed using Microsoft Word 97. The body text font is Arial, 11 point pitch; figure and table description font is Arial, 10 point pitch; and the survey font is Times New Roman, 10 point pitch. All data was analyzed using Microsoft Excel 97 and all charts in the results section were made using the Chart Wizard in Excel.

The charts in section 3.0, Description of Software, were produced in Microsoft Powerpoint 5.0 and were provided courtesy of PMA-233. Updates to the charts were made in Powerpoint 7.0.

Images of the Microsoft Windows 95 and PFPS Desktop were made using the 'Print Screen' function and were saved as bitmaps for import into the document using Microsoft Paint.